L1 ANSWER 1 OF 1 WPIDS COPYRIGHT 1997 DERWENT INFORMATION LTD
AN 89-138445 [19] WPIDS
DNC C89-061216
TI High yield microbial prodn. of 1,3-propane diol from glycerine - using Klebsiella pneumoniae in media contg. cobalt salt and sugar.
DC A41 D16 E17
IN HILL, F F; TRANDINH, K
PA (CHEM) HUELS AG
CYC 1
PI DE 3734764 A 890503 (8919)* 3 pp <--
ADT DE 3734764 A DE 87-3734764 871014
PRAI DE 87-3734764 871014
AB DE 3734764 A UPAB: 930923
Prodn. of 1,3-propanediol (I) comprises aerobic fermentation of glycerine (II) with Klebsiella pneumonias DSM 4280 in presence of at least one pentose or hexose and of divalent Co salts.

Fermentation is in presence of glucose and of 0.01-100, esp. 0.05-10 microM CoCl2, at 25-35 deg. C and pH 4-7, esp. 30-33 deg. C and pH 4.5-6. Fermentation is in an aq. medium contg., initially, 5-15% (II) and 2-10% metabolisable carbohydrate, opt. with other nutrients. After fermentation, the cells are removed and (I) recovered from the liq. phase by distn. and fractional distn. Some 2,3-butanediol is formed as by product, the amt. depending on pH and temp.

USE/ADVANTAGE - (I) is useful in prodn. of polyesters, polyurethanes and special heterocyclic cpds. This method provides high conversion and yields (e.g. 60-82g (I) per 100 g (II)and uses renewable starting material.
0/0

L6 ANSWER 1 OF 2 WPIDS COPYRIGHT 1997 DERWENT INFORMATION LTD
AN 91-303977 [42] WPIDS
DNC C91-131650
TI Anaerobic microbial conversion of substrate to metabolite - is in airlift reactor with passage of inert gas.
DC D16 E17
IN CARDUCK, F J; DECKWER, W D; GUNZEL, B; KRETSCHMAN, J; YONSEL, S
PA (GBFB) GES BIOTECHNOL GBF; (HENK) HENKEL KGAA
CYC 15
PI DE 4010523 A 911010 (9142)*
WO 9115590 A 911017 (9144) <--
RW: AT BE CH DE DK ES FR GB GR IT LU NL SE
W: JP US
ADT DE 4010523 A DE 90-4010523 900402
PRAI DE 90-4010523 900402
AB DE 4010523 A UPAB: 930928
In the microbial conversion of a substrate to a metabolite under anaerobic conditions in a fermenter, (a) the fermenter is a bubble-tube reactor with no mechanically moving inserts, and (b) a gas free from O2 is pressed into the lower region of the reactor during the fermentation to convey the fermentation feed.

O2-free gases are the fermentation gases taken off at the head of the reactor, and/or inert gases, e.g. N2, CO2 or Ar. Rate of gas feed is 0.001-0.2 (0.03-0.07) vvm, fed centrally (pref. axially) to the bottom of the tower reactor through a pipe or a gasification ring. Reactor pref. has a ratio of height:dia. of 5:20-10, and may have static inserts promoting mixing, esp. recycling loops, which are central or on the walls and act as sepn. wall. Prods. and/or recycled culture medium is sprayed onto the foam, through a nozzle in the upper part of the reactor, to control foam. Microorganism is pref. Clostridium butyricum.

USE/ADVANTAGE - Useful for conversion of glycerol to propane 1,3-diol, using anaerobic micro-organisms. Foaming is low, (almost) without use of an anti-foam.

0/0

L6 ANSWER 2 OF 2 WPIDS COPYRIGHT 1997 DERWENT INFORMATION LTD
AN 90-100720 [14] WPIDS
CR 90-084142 [12]
DNC C90-044201
TI 1,3-Propane di ol prodn. by fermentation of aq. glycerine soln. - with selected microorganism, then removal of biomass and distn. of prod..
DC D16 E17
IN BIEBL, H; CARDUCK, F J; DECKWER, P; KRETSCHMAN, J; TAG, C; CARDUCK, F; DECKWER, W; KRETSCHMANN, J
PA (GBFG) GES BIOTECH FORCHUNG; (GBFB) GES BIOTECH FORSCH GMBH; (HENK) HENKEL KGAA; (GBFB) GBF GES BIOTECH FORSCHUNG GMBH
CYC 12
PI EP 361082 A 900404 (9014)* DE 16 pp <--
R: AT BE CH DE ES FR GB IT LI NL
DK 8904231 A 900302 (9022)
DE 3924423 A 910131 (9106)
US 5254467 A 931019 (9343) 8 pp
ADT EP 361082 A EP 89-115555 890823; DE 3924423 A DE 89-3924423 890724; US 5254467 A CIP of US 89-402209 890901, US 91-691648 910425
PRAI DE 88-3829618 880901; DE 89-3924423 890724
AB EP 361082 A UPAB: 931207
Process for conversion of glycerine into 1,3-propanediol by microorganisms using a strain of microorganisms selected from clostridium, Enterobacterium, Lactobacillus, Citrobacter, Aerobacter and Klebsiella which is capable of converting glycerine into 1,3-propanediol in a space time yield of more than 0.5 g per hr. per l in a 5 wt% glycerine soln. as sole carbon source under standard fermentation conditions, comprises using the chosen microorganism for conversion of a 5-20 wt%., (10-15 wt%) soln. of glycerine as sole carbon source under anaerobic conditions while maintaining a constant pH, and after extensive conversion of the glycerine, sepg. obtd. biomass and working up the prod. mixt. by distn.
USE/ADVANTAGE - Used for technical scale use, esp. for prodn. of 1,3-propanediol from glycerine waters obtd. from the industrial processing of triglycerides, esp. glycerine solns. from the saponification and/or transesterification of fats without post-treatment of the glycerine-water phase.
Dwg.0/0

L5 ANSWER 1 OF 1 WPIDS COPYRIGHT 1997 DERWENT INFORMATION LTD
AN 94-007553 [01] WPIDS
DNC C94-003076
TI Bacterial prod. for converting glycerol to 1,3-propane diol in high yield - derived from new anaerobic strains of Enterobacter, Corynebacterium or Citrobacter.
DC A41 B05 B07 D13 D16 D18 E17
IN BORIES, A; CLARET, C
PA (INRG) INST NAT RECH AGRONOMIQUE; (INRG) INRA INST NAT RECH AGRONOMIQUE
CYC 17
PI WO 9325696 A1 931223 (9401)* FR 34 pp <--
FR 2692281 A1 931217 (9403) 25 pp
EP 648273 A1 950419 (9520) FR
EP 648273 B1 960828 (9639) FR 14 pp
R: AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE
DE 69304332 E 961002 (9645)
ADT WO 9325696 A1 WO 93-FR568 930614; FR 2692281 A1 FR 92-7212 920615; EP 648273 A1 EP 93-913124 930614, WO 93-FR568 930614; EP 648273 B1 EP 93-913124 930614, WO 93-FR568 930614; DE 69304332 E DE 93-604332 930614, EP 93-913124 930614, WO 93-FR568 930614
PDT EP 648273 A1 Based on WO 9325696; EP 648273 B1 Based on WO 9325696;

.DE 69304332 E Based on EP 648273, Based on WO 9325696
RAI FR 92-7212 920615
B WO 9325696 A UPAB: 940217
Bacterial products (A) which can convert glycerol (I) to 1.3-propanediol (II) are prepd. by: (1) preculture of anaerobic populations, derived from anaerobic habitats, under anaerobic conditions on a buffered nutrient medium contg. (I) as sole carbon source; (2) isolating those precultures able to ferment (I); (3) enriching these precultures by discontinuous fermentation in an anaerobic reactor on (I)-based medium of controlled pH, and (4) isolating (A).

Also new are (A) themselves and the bacterial strains Enterobacter agglomerans CNCM I-1210 (most pref.); Clostridium butyricum I-1211 and Citrobacter amalonaticus I-1212.

USE/ADVANTAGE - (A) provide high yield conversion of (I) to (II) without significant by-product formation. (II) is used in synthesis of polyurethanes and polyesters; as an additive (esp. humectant) for foods and pharmaceuticals; in animal feeds; tobacco etc. (II) can now be produced from animal/plant waste materials, partic. by-products of alcohol distn.; avoiding the chemical synthesis from acrolein (which is toxic; derived from non-renewable resources and converted only with significant by-product formation). Dwg.0/5

9 ANSWER 1 OF 1 CAPLUS COPYRIGHT 1997 ACS
N 1994:126576 CAPLUS
N 120:126576
I ***Cloning*** and characterization of the propanediol dehydratase genes in ***Salmonella*** typhimurium
U ***Otto, Karin Elizabeth***
S Texas Tech Univ., Lubbock, TX, USA
O (1992) 77 pp. Avail.: Univ. Microfilms Int., Order No. DA9238983
From: Diss. Abstr. Int. B 1993, 53(8), 3921
T Dissertation
A English
B Unavailable

11 ANSWER 3 OF 18 CAPLUS COPYRIGHT 1997 ACS
N 1992:446646 CAPLUS
N 117:46646
I Enhancement of 1,3-propanediol production by cofermentation in Escherichia coli expressing Klebsiella pneumoniae dha regulon genes
U ***Tong, I Teh*** ; Cameron, Douglas C.
S Dep. Chem. Eng., Univ. Wisconsin, Madison, WI, 53706-1691, USA
O ***Appl*** . Biochem. Biotechnol. (1992), 34-35, 149-59
CODEN: ABIBDL; ISSN: 0273-2289
T Journal
A English
B 1,3-Propanediol (I) is an intermediate in chem. and polymer synthesis. The genes of a biochem. pathway responsible for I prodn., the dha regulon of K. pneumoniae, have been previously expressed in E. coli. An anal. of the max. theor. yield of I from glycerol indicates that the yield can be improved by the cofermn. of sugars, provided that kinetic constraints are overcome. The yield of I from glycerol was improved from 0.46 mol/mol with glycerol alone to 0.63 mol/mol with glucose cofermn. and 0.55 mol/mol with xylose cofermn. The engineered E. coli also provides a model system for the study of metabolic pathway engineering.

12 ANSWER 3 OF 6 CAPLUS COPYRIGHT 1997 ACS
N 1990:419840 CAPLUS
N 113:19840
I Utilization of glycerol as a hydrogen acceptor by Lactobacillus

.reuteri: purification of 1,3-propanediol:NAD+ oxidoreductase
AU ***Talarico, Todd L.*** ; Axelsson, Lars T.; Novotny, James; Fiuzat, Mitra; Dobrogosz, Walter J.
CS Dep. Microbiol., North Carolina State Univ., Raleigh, NC, 27695, USA
SO ***Appl*** . Environ. Microbiol. (1990), 56(4), 943-8
CODEN: AEMIDF; ISSN: 0099-2240
DT Journal
LA English
AB L. reuteri utilizes exogenously added glycerol as a H acceptor during carbohydrate fermns., resulting in higher growth rates and cell yields than those obtained during growth on carbohydrates alone. Glycerol is 1st converted to 3-hydroxypropionaldehyde by a coenzyme B12-dependent glycerol dehydratase and then reduced to 1,3-propanediol by an NAD-dependent oxidoreductase. The latter enzyme was purified and detd. to have a mol. wt. of 180,000; it is predicted to exist as a tetramer of identical 42,000-mol.-wt. subunits.

L14 ANSWER 4 OF 6 CAPLUS COPYRIGHT 1997 ACS
AN 1995:493624 CAPLUS
DN 123:136863
TI Purification of 1,3-propanediol dehydrogenase from Citrobacter freundii and cloning, sequencing, and overexpression of the corresponding gene in Escherichia coli
AU ***Daniel, Rolf*** ; Boenigk, Rainer; Gottschalk, Gerhard
CS Institut fur Mikrobiologie, Georg-August-Universitat Gottingen, Gottingen, D-37077, Germany
SO J. ***Bacteriol*** . (1995), 177(8), 2151-6
CODEN: JOBAAY; ISSN: 0021-9193
DT Journal
LA English
AB 1,3-Propanediol dehydrogenase (EC 1.1.1.202) was purified to homogeneity from Citrobacter freundii grown anaerobically on glycerol in continuous culture. The enzyme is an octamer of a polypeptide of 43,400 Da. When tested as a dehydrogenase, the enzyme was most active with substrates contg. 2 primary alc. groups sepd. by 1 or 2 carbon atoms. In the physiol. direction, 3-hydroxypropionaldehyde was the preferred substrate. The apparent Km values of the enzyme for 3-hydroxypropionaldehyde and NADH were 140 and 33 .mu.M, resp. The enzyme was inhibited by chelators of divalent cations but could be reactivated by the addn. of Fe2+. The dhaT gene, encoding the 1,3-propanediol dehydrogenase, was cloned, and its nucleotide sequence (1164 bp) was detd. The deduced dhaT gene product (387 amino acids, 41,324 Da) showed a high level of similarity to a novel family (type III) of alc. dehydrogenases. The dhaT gene was overexpressed in Escherichia coli 274-fold by using the T7 RNA polymerase/promoter system.

FILE 'REGISTRY' ENTERED AT 12:11:54 ON 09 DEC 1997
L1 477 S HYDRATASE?

FILE 'MEDLINE' ENTERED AT 12:12:06 ON 09 DEC 1997
L2 1 S L1

FILE 'REGISTRY' ENTERED AT 12:12:32 ON 09 DEC 1997
L3 581 S DEHYDRATASE?

FILE 'MEDLINE' ENTERED AT 12:12:50 ON 09 DEC 1997
L4 5 S L3

FILE 'REGISTRY' ENTERED AT 12:13:58 ON 09 DEC 1997
L5 1 S GLYCEROL DEHYDRATASE
L6 2 S DIOL DEHYDRATASE

FILE 'MEDLINE' ENTERED AT 12:14:36 ON 09 DEC 1997
L7 0 S L5
L8 0 S L6
E DEHYDRATASES/CT
E E4
E DEHYDRATASE/CT
E DEHYDRATASE/CN
E HYDRO LYASES
E HYDRO LYASES/CT
L9 2938 S E9
L10 77716 S CLONING, MOLECULAR/CT
L11 125 S L9 AND L10
L12 37111 S KLEBSIELLA OR LACTOBACILLUS OR ENTEROBACTER OR CITROBACTER OR PELOBACTER OR ILYOBACTER OR CLOSTRIDIUM
L13 4 S L11 AND L12
E GLYCEROL DEHYDRATASE
E GLYCEROL DEHYDRATASE/CT
E DIOL DEHYDRATASE
E DIOL DEHYDRATASE/CT
E DIOL DEHYDRATASE/CN
E GLYCEROL DEHYDRATASE/CN
L14 12 S E3
L15 0 S L14 NOT L9
L16 155 S L12 AND L9 NOT L13
E KLEBSIELLA/CN
E KLEBSIELLA/CT
E L9
E HYDRO LYASES/CT
L17 291 S E22
L18 7 S L17 AND L12
L19 3 S L18 NOT L13

FILE 'SCISEARCH' ENTERED AT 12:32:16 ON 09 DEC 1997
E SPRENGER G, 1989/RE
E SPRENGER G A, 1989/RE
L20 9 S E4

L4 ANSWER 1 OF 5 MEDLINE
TI . Site-directed mutagenesis of monofunctional chorismate mutase engineered from the E. coli P-protein.

L4 ANSWER 2 OF 5 MEDLINE
TI Genetic aspects of aromatic amino acid biosynthesis inLactococcus lactis.

L4 ANSWER 3 OF 5 MEDLINE
TI The pheA/tyrA/aroF region from Erwinia herbicola: an emerging comparative basis for analysis of gene organization and regulation in enteric bacteria.

L4 ANSWER 4 OF 5 MEDLINE
TI Loss of allosteric control but retention of thebifunctional catalytic competence of a fusion protein formed by excision of 260 base pairs from the 3' terminus qfheA from Erwinia herbicola.

L4 ANSWER 5 OF 5 MEDLINE
TI Cloning, sequencing, and expression of the P-protein gene (pheA) of Pseudomonas stutzeri in Escherichia coli: implications forevolutionary relationships iphenylalanine biosynthesis.

L13 ANSWER 1 OF 4 MEDLINE
AN 96422012 MEDLINE
TI Cloning, sequencing, and overexpression of the genes encoding coenzyme B12-dependent glycerol dehydratase of ***Citrobacter*** freundii.
AU Seyfried M; Daniel R; Gottschalk G
CS Institut fur Mikrobiologie der Georg-August-Universitat, Gottingen, Germany.
SO JOURNAL OF BACTERIOLOGY, (1996 Oct) 178 (19) 5793-6. Journal code: HH3. ISSN: 0021-9193. CY United States
DT Journal; Article; (JOURNAL ARTICLE) LA English FS Priority Journals OS GENBANK-U09771 EM 9701 EW 19970104
AB The genes encoding coenzyme B12-dependent glycerol dehydratase of ***Citrobacter*** freundii were cloned and overexpressed in Escherichia coli. The B12-free enzyme was purified to homogeneity. It consists of three types of subunits whose N-terminal sequences are in accordance with those deduced from the open reading frames dhaB, dhaC, and dhaE, coding for subunits of 60,433 (alpha), 21,487 (beta), and 16,121 (gamma) Da, respectively. The enzyme complex has the composition alpha2beta2gamma2. Amino acid alignments with the subunits of the recently sequenced diol dehydratase of ***Klebsiella*** oxytoca (T. Tobimatsu, T. Hara, M. Sakaguchi, Y. Kishimoto, Y. Wada, M. Isoda, T. Sakai, and T. Toraya, J. Biol. Chem. 270:7142-7148, 1995) revealed identities between 51.8 and 70.9%.
CT Check Tags: Comparative Study
Bacterial Proteins: BI, biosynthesis
*Bacterial Proteins: GE, genetics
Bacterial Proteins: IP, isolation & purification
Chromatography, Affinity
*** Citrobacter freundii: EN, enzymology***
****Citrobacter freundii: GE, genetics***
*** Cloning, Molecular***
*Cobamides: ME, metabolism
Escherichia coli: GE, genetics
*Genes, Bacterial

L1 ANSWER 1 OF 1 WPIDS [redacted]PYRIGHT 1997 DERWENT INF[redacted]ATION LTD
AN 89-138445 [19] WPIDS
DNC C89-061216
TI High yield microbial prodn. of 1,3-propane diol from glycerine - using Klebsiella pneumoniae in media contg. cobalt salt and sugar.
DC A41 D16 E17
IN HILL, F F; TRANDINH, K
PA (CHEM) HUELS AG
CYC 1
PI DE 3734764 A 890503 (8919)* 3 pp <--
ADT DE 3734764 A DE 87-3734764 871014
PRAI DE 87-3734764 871014
AB DE 3734764 A UPAB: 930923
Prodn. of 1,3-propanediol (I) comprises aerobic fermentation of glycerine (II) with Klebsiella pneumonias DSM 4280 in presence of at least one pentose or hexose and of divalent Co salts.

Fermentation is in presence of glucose and of 0.01-100, esp. 0.05-10 microM CoCl2, at 25-35 deg. C and pH 4-7, esp. 30-33 deg. C and pH 4.5-6. Fermentation is in an aq. medium contg., initially, 5-15% (II) and 2-10% metabolisable carbohydrate, opt. with other nutrients. After fermentation, the cells are removed and (I) recovered from the liq. phase by distn. and fractional distn. Some 2,3-butanediol is formed as by product, the amt. depending on pH and temp.

USE/ADVANTAGE - (I) is useful in prodn. of polyesters, polyurethanes and special heterocyclic cpds. This method provides high conversion and yields (e.g. 60-82g (I) per 100 g (II)and uses renewable starting material.
0/0

*** Hydro-Lyases: BI, biosynthesis***
****Hydro-Lyases: GE, genetics***
*** Hydro-Lyases: IP, isolation & purification***
Molecular Sequence Data
Protein Conformation
Recombinant Proteins: BI, biosynthesis
Recombinant Proteins: IP, isolation & purification
Sequence Analysis, DNA
Sequence Homology, Amino Acid
Species Specificity
CN EC 4.2.1. (Hydro-Lyases); EC 4.2.1.30 (glycerol dehydratase); 0 (Bacterial Proteins); 0 (Cobamides); 0 (Recombinant Proteins)

L13 ANSWER 2 OF 4 MEDLINE
AN 96394290 MEDLINE
TI Cloning, sequencing, and high level expression of the genes encoding adenosylcobalamin-dependent glycerol dehydrase of ***Klebsiella*** pneumoniae.
AU Tobimatsu T; Azuma M; Matsubara H; Takatori H; Niida T; Nishimoto K; Satoh H; Hayashi R; Toraya T
CS Department of Bioscience and Biotechnology, Faculty of Engineering, Okayama University, Tsushima-Naka, Okayama 700, Japan.
SO JOURNAL OF BIOLOGICAL CHEMISTRY, (1996 Sep 13) 271 (37) 22352-7. Journal code: HIV. ISSN: 0021-9258.CY United StatesDT Journal; Article; (JOURNAL ARTICLE)
LA English FS Priority Journals; Cancer Journals EM 9701 EW 19970104
AB The gld genes encoding adenosylcobalamin-dependent glycerol dehydrase of ***Klebsiella*** pneumoniae were cloned by cross-hybridization with a DNA fragment of ***Klebsiella*** oxytoca diol dehydrase genes. Since the Escherichia coli clones isolated did not show appreciable enzyme activity, plasmids for high level expression of cloned genes were constructed. The enzyme expressed in E. coli was indistinguishable from the wild-type glycerol dehydrase of K. pneumoniae by the criteria of polyacrylamide gel electrophoretic, immunochemical, and catalytic properties. It was also shown that the recombinant functional enzyme consists of Mr 61,000, 22,000, and 16, 000 subunits. Sequence analysis of the genes revealed four open reading frames separated by 2-12 bases. The sequential three open reading frames from the first to the third (gldA, gldB, and gldC genes) encoded polypeptides of 555, 194, and 141 amino acid residues with predicted molecular weights of 60,659(alpha), 21,355(beta), and 16,104(gamma), respectively. High level expression of these three genes in E. coli produced more than 14-fold higher level of fully active apoenzyme than that in K. pneumoniae. It was thus concluded that these are the genes encoding the subunits of glycerol dehydrase. The deduced amino acid sequences of the three subunits were 71, 58, and 54% identical with those of the alpha, beta, and gamma subunits of diol dehydrase, respectively, but failed to show any apparent homology with other proteins.
CT Check Tags: Support, Non-U.S.Gov't
Amino Acid Sequence
Base Sequence
*** Cloning, Molecular***
DNA, Bacterial: CH, chemistry
Electrophoresis, Gel, Two-Dimensional
Escherichia coli
Gene Expression Regulation, Enzymologic
*** Hydro-Lyases: CH, chemistry***
****Hydro-Lyases: GE, genetics***
*** Hydro-Lyases: ME, metabolism***
****Klebsiella pneumoniae: EN, enzymology***
Molecular Sequence Data
Plasmids: ME, metabolism
Propanediol Dehydratase: CH, chemistry
Propanediol Dehydratase: GE, genetics
Propanediol Dehydratase: ME, metabolism
Restriction Mapping
Sequence Homology, Amino Acid
Sequence Homology, Nucleic Acid
CN EC 4.2.1. (Hydro-Lyases); EC 4.2.1.28 (Propanediol Dehydratase); EC 4.2.1.30 (glycerol dehydratase); 0 (DNA, Bacterial); 0 (Plasmids)

L13 ANSWER 3 OF 4 MEDLINE
AN 93122543 MEDLINE
TI Growth temperature-dependent activity of glycerol dehydratase in Escherichia coli expressing the ***Citrobacter*** freundii dha regulon.
AU Daniel R; Gottschalk G
CS Institute fur Mikrobiologie, Georg-August-Universitat, Gottingen, FRG..
SO FEMS MICROBIOLOGY LETTERS, (1992 Dec 15) 79 (1-3) 281-5. Journal code: FML. ISSN: 0378-1097. CY Netherlands DT Journal; Article; (JOURNAL ARTICLE)
LA English FS Priority Journals EM 9304
AB Using the cosmid pWE15, a genomic library of ***Citrobacter*** freundii DNA in Escherichia coli ECL707 was prepared and screened for glycerol utilization. Six out of approximately 3000 clones were positive. One clone, harboring the recombinant cosmid pRD1, expressed glycerol dehydratase in high activity when grown at 28 degrees C but not at 37 degrees C. The growth temperature had little effect on the activity of the other enzymes encoded by the dha regulon. When the glycerol-containing medium was supplemented with corrinoids, the recombinant E. coli strain produced 1,3-propanediol in high amounts at 28 degrees C.
CT Check Tags: Support, Non-U.S.Gov't
****Citrobacter freundii: EN, enzymology***
*** Citrobacter freundii: GE, genetics***
*** Cloning, Molecular***
*Escherichia coli: EN, enzymology
Escherichia coli: GD, growth & development
Escherichia coli: GE, genetics
Genes, Bacterial
Genes, Regulator
Glycerin: ME, metabolism
*** Hydro-Lyases: GE, genetics***
****Hydro-Lyases: ME, metabolism***
Propanediols: ME, metabolism
Temperature
RN 504-63-2 (1,3-propanediol); 56-81-5 (Glycerin)
CN EC 4.2.1. (Hydro-Lyases); EC 4.2.1.30 (glycerol dehydratase); 0 (Propanediols)
GEN dha

L13 ANSWER 4 OF 4 MEDLINE
AN 92412068 MEDLINE
TI Cloning and properties of a cyanide hydratase gene from the phytopathogenic fungus Gloeocercospora sorghi.
AU Wang P; VanEtten H D
CS Department of Plant Pathology, University of Arizona, Tucson 85721..
SO BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS, (1992 Sep 16) 187 (2) 1048-54. Journal code: 9Y8. ISSN: 0006-291X. CY United States
DT Journal; Article; (JOURNAL ARTICLE) LA English FS Priority Journals; Cancer Journals
OS GENBANK-M99044; GENBANK-S41678; GENBANK-S41679; GENBANK-S41680; GENBANK-S41731; GENBANK-D10916; GENBANK-D10917; GENBANK-D10918; GENBANK-D10919; GENBANK-D10920 EM 9212
AB The Cht gene encoding cyanide hydratase (CHT, EC 4.2.1.66), which detoxifies HCN and is thought to be important in fungal infection of cyanogenic plants, has been cloned from the phytopathogenic fungus Gloeocercospora sorghi. The gene was isolated by screening an expression library of G. sorghi using a CHT-specific antibody and using one of the positive cDNA clones as a probe in Southern hybridization to identify a 3.1 kb PstI genomic fragment. This PstI fragment expressed CHT activity when transformed into Aspergillus nidulans, a fungus that normally lacks CHT activity. Sequence analysis identified a single open reading frame of 1,107 base pairs which encodes a polypeptide of 40,904 daltons. The deduced amino acid sequence of CHT shares 36.5% identity to a nitrilase from the bacterium ***Klebsiella*** pneumoniae subsp. ozaenae.
CT Check Tags: Comparative Study
Amino Acid Sequence
Aminohydrolases: CH, chemistry
Aspergillus nidulans: GE, genetics
Base Sequence
Blotting, Southern
****Cloning, Molecular***
DNA: CH, chemistry
DNA: IP, isolation & purification
DNA Probes
*** Hydro-Lyases: CH, chemistry***
****Hydro-Lyases: GE, genetics***
*Hyphomycetes: EN, enzymology
Hyphomycetes: GE, genetics
*** Klebsiella pneumoniae: EN, enzymology***

Molecular Sequence Data
Nucleic Acid Hybridization
Poly A: GE, genetics
Potassium Cyanide: PD, pharmacology
RNA: GE, genetics
Sequence Homology, Nucleic Acid
Transcription, Genetic
Transformation, Genetic
Translation, Genetic
RN 151-50-8 (Potassium Cyanide); 24937-83-5 (Poly A); 63231-63-0 (RNA); 9007-49-2 (DNA)
CN EC 3.5.4. (Aminohydrolases); EC 3.5.5.1 (nitrilase); EC 4.2.1. (Hydro-Lyases); EC 4.2.1.66 (cyanide hydratase); 0 (DNA Probes); 0 (RNA, Messenger)

L19 ANSWER 1 OF 3 MEDLINE
TI Analysis of acyl coenzyme A binding to the transcription factor FadR and identification of amino acid residues in the carboxyl terminus required for ligand binding.

L19 ANSWER 2 OF 3 MEDLINE
TI The nucleotide sequence of genes involved in the leucine biosynthetic pathway of ***Clostridium*** pasteurianum.

L19 ANSWER 3 OF 3 MEDLINE
TI Anaerobic growth of Escherichia coli on glycerol by importing genes of the dha regulon from ***Klebsiella*** pneumoniae.

L19 ANSWER 3 OF 3 MEDLINE
AN 90155202 MEDLINE
TI Anaerobic growth of Escherichia coli on glycerol by importing genes of the dha regulon from ***Klebsiella*** pneumoniae.
AU Sprenger G A; Hammer B A; Johnson E A; Lin E C
CS Department of Microbiology and Molecular Genetics, Harvard Medical School, Boston, MA 02115.
NC 5-RO1-GM11983 (NIGMS)
SO JOURNAL OF GENERAL MICROBIOLOGY, (1989 May) 135 (Pt 5) 1255-62. Journal code: I87. ISSN: 0022-1287. CY ENGLAND: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE) LA English FS Priority Journals EM 9005
AB The dha regulon of ***Klebsiella*** pneumoniae specifying fermentative dissimilation of glycerol was mobilized by the broad-host-range plasmid RP4:mini Mu and introduced conjugatively into Escherichia coli. The recipient E. coli was enabled to grow anaerobically on glycerol without added hydrogen acceptors, although its cell yield was less than that of K. pneumoniae. The reduced cell yield was probably due to the lack of the coenzyme-B12-dependent glycerol dehydratase of the dha system. This enzyme initiates the first step in an auxiliary pathway for disposal of the extra reducing equivalents from glycerol. The lack of this enzyme would also account for the absence of 1,3-propanediol (a hallmark fermentation product of glycerol) in the spent culture medium. In a control experiment, a large quantity of this compound was detected in a similar culture medium following the growth of K. pneumoniae. The other three known enzymes of the dha system, glycerol dehydrogenase, dihydroxyacetone kinase and 1,3-propanediol oxidoreductase, however, were synthesized at levels comparable to those found in K. pneumoniae. Regulation of the dha system in E. coli appeared to follow the same pattern as in K. pneumoniae: the three acquired enzymes were induced by glycerol, catabolite repressed by glucose, and glycerol dehydrogenase was post-translationally inactivated during the shift from anaerobic to aerobic growth. The means by which the E. coli recipient can achieve redox balance without formation of 1,3-propanediol during anaerobic growth on glycerol remains to be discovered.
CT Check Tags: Support, Non-U.S. Gov't; Support, U.S. Gov't, P.H.S.
Alcohol Oxidoreductases: GE, genetics
Anaerobiosis
Bacterial Proteins: GE, genetics
Conjugation, Genetic
Energy Metabolism
*Escherichia coli: GD, growth & development
Escherichia coli: GE, genetics
Escherichia coli: ME, metabolism
Fermentation
*Genes, Bacterial
Glycerin: ME, metabolism
*** Hydro-Lyases: GE, genetics***
Hydro-Lyases: PH, physiology
****Klebsiella pneumoniae: GE, genetics***
Oxidation-Reduction
Phosphotransferases: GE, genetics
Plasmids
Sugar Alcohol Dehydrogenases: GE, genetics
RN 56-81-5 (Glycerin)
CN EC 1.1 (Alcohol Oxidoreductases); EC 1.1. (Sugar Alcohol Dehydrogenases); EC 1.1.1.6 (glycerol dehydrogenase); EC 1.1.1.77 (lactaldehyde reductase); EC 2.7 (Phosphotransferases); EC 2.7.1.29 (glycerone kinase); EC 4.2.1. (Hydro-Lyases); EC 4.2.1.30 (glycerol dehydratase); 0 (Bacterial Proteins); 0 (Plasmids)

L20 ANSWER 1 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI Glycerol conversion to 1,3-propanediol by Clostridium pasteurianum: cloning and expression of the gene encoding 1,3-propanediol dehydrogenase

L20 ANSWER 2 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI Structure and gene-polypeptide relationships of the region encoding glycerol diffusion facilitator (glpF) and glycerol kinase (glpK) of Pseudomonas aeruginosa

L20 ANSWER 3 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF THE OXIDATIVE BRANCH OF GLYCEROL UTILIZATION BY CITROBACTER-FREUNDII

L20 ANSWER 4 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI CLONING AND NUCLEOTIDE-SEQUENCE OF THE GLPD GENE ENCODING SN-GLYCEROL-3-PHOSPHATE DEHYDROGENASE OF PSEUDOMONAS-AERUGINOSA

L20 ANSWER 5 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI DIOL DEHYDRASE AND GLYCEROL DEHYDRASE, COENZYME B-12-DEPENDENT ISOZYMES

L20 ANSWER 6 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI MAPPING AND CLONING OF GLDA, THE STRUCTURAL GENE OF THE ESCHERICHIA-COLI GLYCEROL DEHYDROGENASE

L20 ANSWER 7 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI ANALYSIS OF THE ESCHERICHIA-COLI GENOME .4. DNA-SEQUENCE OF THE REGION FROM 89.2 TO 92.8 MINUTES

L20 ANSWER 8 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI GROWTH TEMPERATURE-DEPENDENT ACTIVITY OF GLYCEROL DEHYDRATASE IN ESCHERICHIA-COLI EXPRESSING THE CITROBACTER-FREUNDII DHA REGULON

L20 ANSWER 9 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
TI 1,3-PROPANEDIOL PRODUCTION BY ESCHERICHIA-COLI EXPRESSING GENES FROM THE KLEBSIELLA-PNEUMONIAE-DHA REGULON

L20 ANSWER 1 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
AN 97:718159 SCISEARCH
GA The Genuine Article (R) Number: XX393
TI Glycerol conversion to 1,3-propanediol by Clostridium pasteurianum: cloning and expression of the gene encoding 1,3-propanediol dehydrogenase
AU Luers F; Seyfried M; Daniel R; Gottschalk G (Reprint)
CS UNIV GOTTINGEN, INST MIKROBIOL, GRISEBACHSTR 8, D-37077 GOTTINGEN, GERMANY (Reprint); UNIV GOTTINGEN, INST MIKROBIOL, D-37077 GOTTINGEN, GERMANY
CYA GERMANY
SO FEMS MICROBIOLOGY LETTERS, (15 SEP 1997) Vol. 154, No. 2, pp. 337-345. Publisher: ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS.
ISSN: 0378-1097. DT Article; Journal FS LIFE LA English REC Reference Count: 34
AB When grown on glycerol as sole carbon and energy source, cell extracts of Clostridium pasteurianum exhibited activities of glycerol dehydrogenase, dihydroxyacetone kinase, glycerol dehydratase and 1,3-propanediol dehydrogenase. The genes encoding the latter two enzymes were cloned by colony hybridization using the dhaT gene of Citrobacter freundii as heterologous DNA probe and expressed in Escherichia coli. The native molecular mass of 1,3-propanediol dehydrogenase (DhaT) is 440 000 Da. The dhaT gene of C. pasteurianum was subcloned and its nucleotide sequence (1158 bp) was determined. The deduced gene product (41 776 Dal revealed high similarity to DhaT of C. freundii (80.5% identity; 89.8% similarity).
CC MICROBIOLOGY
ST Author Keywords: Clostridium pasteurianum; 1,3-propanediol dehydrogenase; 1,3-propanediol; glycerol fermentation; type III alcohol dehydrogenase; glycerol dehydratase
STP KeyWords Plus (R): ESCHERICHIA-COLI; ALCOHOL-DEHYDROGENASE; CITROBACTER-FREUNDII; MOLECULAR CHARACTERIZATION; KLEBSIELLA-PNEUMONIAE; ZYMOMONAS-MOBILIS; SEQUENCE-ANALYSIS; DHA REGULON; PROTEIN OVEREXPRESSION
RF 95-0536 001; 11-BETA-HYDROXYSTEROID DEHYDROGENASE; FETAL ORIGINS OF CORONARY HEART-DISEASE; APPARENT MINERALOCORTICOID EXCESS SYNDROMES

95-3190 001; INCREASED ABUNDANCE OF SPECIFIC SKELETAL-MUSCLE [redacted]N-TYROSINE PHOSPHATASES; ALPHA-B-CRYSTALLIN EXPRESSION
95-3375 001; THERMUS STRAINS; DNA RELATEDNESS; GENUS AEROMONAS; EMENDED DESCRIPTION OF CAMPYLOBACTER-HYOINTESTINALIS; POLYPHASIC TAXONOMY
95-5061 001; STRUCTURAL GENE; GLTC-DEPENDENT REGULATION OF BACILLUS-SUBTILIS GLUTAMATE SYNTHASE EXPRESSION; ARABIDOPSIS TYPE-1 PROTEIN PHOSPHATASE

RE

Referenced Author (RAU)	Year	VOL	PG	Referenced Work (RPY)/(RVL)/(RPG)	(RWK)
ABBADANDALOUSSI S	1996	142	1149	MICROBIOL-UK	
ANDERSSON L O	1972	20	199	FEBS LETT	
AUSUBEL F M	1987			CURRENT PROTOCOLS MO	
BAIROCH A	1991	19	2241	NUCLEIC ACIDS RES	
BOENIGK R	1991			THESIS G AUGUST U GO	
BRADFORD M M	1976	72	248	ANAL BIOCHEM	
CONWAY T	1987	169	2591	J BACTERIOL	
CONWAY T	1989	171	3754	J BACTERIOL	
DABROCK B	1992	58	1233	APPL ENVIRON MICROB	
DANIEL R	1992	100	281	FEMS MICROBIOL LETT	
DANIEL R	1995	177	2151	J BACTERIOL	
DANIEL R	1995	177	4392	J BACTERIOL	
DEVRIES G E	1992	174	5346	J BACTERIOL	
FISCHER R J	1993	175	6659	J BACTERIOL	
GOODLOVE P E	1989	85	209	GENE	
HEYNDRICKX M	1991	34	637	APPL MICROBIOL BIOT	
HOMANN T	1990	33	121	APPL MICROBIOL BIOT	
JOHNSON E A	1984	160	55	J BACTERIOL	
KELL D B	1981	99	81	BIOCHEM BIOPH RES CO	
KESSLER D	1992	267	18073	J BIOL CHEM	
MARMUR J	1961	3	208	J MOL BIOL	
REID M F	1994	20	13	CRIT REV MICROBIOL	
RUCH F E	1974	119	50	J BACTERIOL	
SANGER F	1977	74	5463	P NATL ACAD SCI USA	
SEYFRIED M	1996	178	5793	J BACTERIOL	
SOHLING B	1996	178	871	J BACTERIOL	
SPRENGER G A	1989	135	1255	J GEN MICROBIOL	<-
STOJILJKOVIC I	1995	177	1357	J BACTERIOL	
TORAYA T	1977	252	963	J BIOL CHEM	
TSE P	1988	110	1295	J AM CHEM SOC	
WALTER K A	1992	174	7149	J BACTERIOL	
WIERENGA R K	1985	24	1346	BIOCHEMISTRY-US	
WILIAMSON V M	1987	209	374	MOL GEN GENET	
YOUNGLESON J S	1988	78	355	GENE	

L20 ANSWER 3 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
AN 95:524431 SCISEARCH
GA The Genuine Article (R) Number: RL828
TI BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF THE OXIDATIVE BRANCH OF GLYCEROL UTILIZATION BY CITROBACTER-FREUNDII
AU DANIEL R; STUERTZ K; GOTTSCHALK G (Reprint)
CS UNIV GOTTINGEN, INST MIKROBIOL, GRISEBACHSTR 8, D-37077 GOTTINGEN, GERMANY (Reprint); UNIV GOTTINGEN, INST MIKROBIOL, D-37077 GOTTINGEN, GERMANY CYA GERMANY
SO JOURNAL OF BACTERIOLOGY, (AUG 1995) Vol. 177, No. 15, pp. 4392-4401. ISSN: 0021-9193. DT Article; Journal FS LIFE A ENGLISH REC Reference Count: 58
AB Glycerol dehydrogenase (EC 1.1.1.6) and dihydroxyacetone kinase (EC 2.7.1.29) were purified from Citrobacter freundii. The dehydrogenase is a hexamer of a polypeptide of 43,000 Da. The enzyme exhibited a rather broad substrate specificity, but glycerol was the preferred substrate in the physiological direction. The apparent K(m)s of the enzyme for glycerol and NAD(+) were 1.27 mM and 57 mu M, respectively. The kinase is a dimer of a polypeptide of 57,000 Da. The enzyme was highly specific for the substrates dihydroxyacetone and ATP; the apparent K(m)s were 30 and 70 mu M, respectively. The DNA region which contained the genes encoding glycerol dehydrogenase (dhaD) and dihydroxyacetone kinase (dhaK) was cloned and sequenced. Both genes were identified by N-terminal sequence comparison. The deduced dhaD gene product (365 amino acids) exhibited high degrees of homology to glycerol dehydrogenases from other organisms and less homology to type III alcohol dehydrogenases, whereas the dhaK gene product (552 amino acids) revealed no significant homology to any other protein in the databases. A large gene (dhaR) of 1,929 bp was found downstream from dhaD. The deduced gene product (641 amino acids) showed significant similarities to members of the sigma(54) bacterial enhancer-binding protein family.
CC MICROBIOLOGY
STP KeyWords Plus (R): ACTIVATED ALCOHOL-DEHYDROGENASE; METAL DISSOCIATION-CONSTANTS; ESCHERICHIA-COLI; KLEBSIELLA-PNEUMONIAE; ZYMOMONAS-MOBILIS; SACCHAROMYCES-CEREVISIAE; NUCLEOTIDE-SEQUENCE; D REGULON; BACILLUS-STEAROTHERMOPHILUS; REGULATORY GENE
RF 93-4847 004; HETEROLOGOUS EXPRESSION; CHROMOSOMAL DNA; GENE ENCODING METHYLMALONYL-COENZYME-A MUTASE
93-7500 002; PROTEIN PHOSPHATASE-1; PHOTOTROPHIC BACTERIUM RHODOBACTER-CAPSULATUS E1F1; CALF UTERUS
93-3088 001; RAT MUSCLE; PROTEIN PHOSPHATASE-1; MAJOR GLUTATHIONE TRANSFERASE
93-6277 001; ESCHERICHIA-COLI MESSENGER-RNA PROMOTER SEQUENCES;TRANSCRIPTION INITIATION; EXPRESSION OF THE CELLULOMONAS-FLAVIGENA CELL-ASSOCIATED AMYLASE GENE
93-7923 001; SULFATE-REDUCING BACTERIUM; ANAEROBIC DEGRADATION; METHANE FORMATION

RE

Referenced Author (RAU)	Year	VOL	PG	Referenced Work (RPY)/(RVL)/(RPG)	(RWK)
ARNOLD W	1988	203	715	J MOL BIOL	
BAIROCH A	1991	19	2241	NUCLEIC ACIDS RES	
BLATTNER F R	1993	21	5408	NUCLEIC ACIDS RES	
BLUM H	1987	8	93	ELECTROPHORESIS	
BOENIGK R	1993	38	453	APPL MICROBIOL BIOT	
BRADFORD M M	1976	72	248	ANAL BIOCHEM	
CONWAY T	1987	169	2591	J BACTERIOL	
CONWAY T	1989	171	3754	J BACTERIOL	
DANIEL R	1992	100	281	FEMS MICROBIOL LETT	
DANIEL R	1995	177	2151	J BACTERIOL	
DEVEREUX J	1984	12	387	NUCLEIC ACIDS RES	
DEVRIES G E	1992	174	5346	J BACTERIOL	
DREWKE C	1988	950	54	BIOCHIM BIOPHYS ACTA	
FISCHER R J	1993	175	6659	J BACTERIOL	
FORAGE R G	1982	151	591	J BACTERIOL	
FRY D C	1986	83	907	P NATL ACAD SCI USA	
GOODLOVE P E	1989	85	209	GENE	
HAWLEY D K	1983	11	2237	NUCLEIC ACIDS RES	
HOMANN T	1990	33	121	APPL MICROBIOL BIOT	
INOUYE S	1988	66	301	GENE	
JOHNSON E A	1984	160	55	J BACTERIOL	
KESSLER D	1992	267	18073	J BIOL CHEM	
KRUGER N	1992	174	4391	J BACTERIOL	
KYHSEANDERSEN J	1984	10	203	J BIOCHEM BIOPH METH	
LAEMMLI U K	1970	270	680	NATURE	
MALLINDER P R	1992	110	9	GENE	
MARCK C	1988	16	1829	NUCLEIC ACIDS RES	
MARTIN R G	1961	236	1372	J BIOL CHEM	
MORETT E	1993	175	6067	J BACTERIOL	
PETTIGREW D W	1988	263	135	J BIOL CHEM	
PFENNIG N	1966	55	245	ARCH MIKROBIOL	
RAMAKRISHNAN G	1990	87	2369	P NATL ACAD SCI USA	
REID M F	1994	20	13	CRIT REV MICROBIOL	
RUCH F E	1974	119	50	J BACTERIOL	
RUCH F E	1980	141	1077	J BACTERIOL	
SAMBROOK J	1989			MOL CLONING LABORATO	
SANGER F	1977	74	5463	P NATL ACAD SCI USA	
SHINE J	1974	71	1342	P NATL ACAD SCI USA	
SHINGLER V	1993	175	1596	J BACTERIOL	
SIEGEL L M	1966	112	346	BIOCHIM BIOPHYS ACTA	

SOHLING B | | | |UNPUB
SPENCER P |1989 |994 |270 |BIOCHIM BIOPHYS ACTA
SPRENGER G A |1989 |135 |1255 |J GEN MICROBIOL <-
SRIDHARA S |1969 |98 |87 |J BACTERIOL
SUTCLIFFE J G |1979 |43 |77 |COLD SPRING HARB SYM
TANG C T |1979 |140 |182 |J BACTERIOL
THORNER J W |1971 |246 |3885 |J BIOL CHEM
TONG I T |1991 |57 |3541 |APPL ENVIRON MICROB
TORAYA T |1977 |252 |963 |J BIOL CHEM
TSE P |1988 |110 |1295 |J AM CHEM SOC
TSE P |1989 |111 |8703 |J AM CHEM SOC
VIEIRA J |1982 |19 |259 |GENE
WALTER K A |1992 |174 |7149 |J BACTERIOL
WANG A Y |1992 |31 |11020 |BIOCHEMISTRY-US
WILLIAMSON V M |1987 |209 |374 |MOL GEN GENET
YAMADA H |1982 |46 |2333 |AGR BIOL CHEM TOKYO
YANISCHPERRON C |1985 |33 |103 |GENE
YOUNGLESON J S |1988 |78 |355 |GENE

L20 ANSWER 5 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
AN 94:207853 SCISEARCH
GA The Genuine Article (R) Number: BZ91T
TI DIOL DEHYDRASE AND GLYCEROL DEHYDRASE, COENZYME B-12-DEPENDENT ISOZYMES
AU TORAYA T (Reprint)
CS OKAYAMA UNIV, FAC ENGN, DEPT BIOTECHNOL, 3-1-1 TSUSHIMA NAKA, OKAYAMA 700, JAPAN (Reprint)
CYA JAPAN
SO METAL IONS IN BIOLOGICAL SYSTEMS, (1994) Vol. 30, pp. 217-254. ISSN: 0161-5149. DT General Review; Journal LA ENGLISH REC Reference Count: 110
CC CHEMISTRY, INORGANIC & NUCLEAR; BIOLOGY, MISCELLANEOUS; BIOCHEMISTRY & MOLECULAR BIOLOGY; BIOPHYSICS
STP KeyWords Plus (R): BOND-DISSOCIATION ENERGY; CARBON-COBALT BOND; CO-C BOND; KLEBSIELLA-PNEUMONIAE; CHEMICAL MODIFICATION; ESCHERICHIA-COLI; DHA REGULON; D-RIBOSE; ADENOSYLCOBALAMIN; ENZYME
RE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)
ABELES R H	1976	9	114	ACCOUNTS CHEM RES
ABELES R H	1964	112	695	ANN NY ACAD SCI
ABELES R H	1960	41	531	BIOCHIM BIOPHYS ACTA
ABELES R H	1971	5	481	ENZYMES
ABELES R H	1961	236	2347	J BIOL CHEM
ABELES R H	1966	241	1245	J BIOL CHEM
ABELES R H	1966	9	686	METHOD ENZYMOL
ABELES R H	1979		373	VITAMIN B12
ANTON D L	1980	102	2215	J AM CHEM SOC
ANTON D L	1980	255	4507	J BIOL CHEM
BABIOR B M	1988	1	21	BIOFACTORS
BABIOR B M	1974	249	1689	J BIOL CHEM
BACHOVCHIN W W	1977	16	1082	BIOCHEMISTRY-US
BACHOVCHIN W W	1978	17	2218	BIOCHEMISTRY-US
BONT J A M	1982	714	465	BIOCHIM BIOPHYS ACTA
BROWNSTEIN A M	1961	236	1199	J BIOL CHEM
COCKLE S A	1972	94	275	J AM CHEM SOC
DANIEL R	1992	100	281	FEMS MICROBIOL LETT
EAGAR R G	1975	14	5523	BIOCHEMISTRY-US
EBERHARD G	1988	369	1091	BIOL CHEM HOPPESEYLE
ESSENBERG M K	1971	93	1242	J AM CHEM SOC
FINKE R G	1984	54	1	COORDIN CHEM REV
FINLAY T H	1972	247	4197	J BIOL CHEM
FINLAY T H	1973	248	1285	J BIOL CHEM
FORAGE R G	1979	569	249	BIOCHIM BIOPHYS ACTA
FORAGE R G	1982	149	413	J BACTERIOL
FORAGE R G	1982	151	591	J BACTERIOL
FREY P A	1967	29	873	BIOCHEM BIOPH RES CO
FREY P A	1970	92	4488	J AM CHEM SOC
FREY P A	1966	241	2732	J BIOL CHEM
FREY P A	1967	242	5369	J BIOL CHEM
GOLDING B T	1982	1	543	B12
HALPERN J	1984	106	8317	J AM CHEM SOC
HARTMANIS M G N	1986	245	144	ARCH BIOCHEM BIOPHYS
HAY B P	1986	108	4820	J AM CHEM SOC
HAY B P	1987	109	8012	J AM CHEM SOC
HONDA S	1980	143	1458	J BACTERIOL
HOSOI N	1978	56	566	J FERMENT TECHNOL
ICHIKAWA M	1988	952	191	BIOCHIM BIOPHYS ACTA
ISHIDA A	1993	32	1535	BIOCHEMISTRY-US
ISHIDA A	1993	39	115	J NUTR SCI VITAMINOL
JENSEN F R	1975	62	816	BIOCHEM BIOPH RES CO
JOHNSON B C	1975	42	315	METHOD ENZYMOL
KROUWER J S	1980	612	153	BIOCHIM BIOPHYS ACTA
KUNO S	1980	205	240	ARCH BIOCHEM BIOPHYS
KUNO S	1981	210	474	ARCH BIOCHEM BIOPHYS
KUNO S	1981	211	722	ARCH BIOCHEM BIOPHYS
KUNO S	1990	277	211	ARCH BIOCHEM BIOPHYS
LEE H A	1963	238	2367	J BIOL CHEM
MCGEE D E	1982	108	547	BIOCHEM BIOPH RES CO
MCGEE D E	1981	20	4293	BIOCHEMISTRY-US
MOORE K W	1979	87	1052	BIOCHEM BIOPH RES CO
OBRADORS N	1988	170	2159	J BACTERIOL
OCHIAI E I	1975	37	351	J INORG NUCL CHEM
PAWELKIEWICZ J	1965	12	207	ACTA BIOCHIM POL
PAWELKIEWICZ J	1964	112	703	ANN NY ACAD SCI
POZNANSKAJA A A	1979	194	379	ARCH BIOCHEM BIOPHYS
POZNANSKAYA A A	1977	484	236	BIOCHIM BIOPHYS ACTA
QUASTEL J H	1925	19	304	BIOCHEM J
RETEY J	1966	22	502	EXPERIENTIA
RETEY J	1966	22	72	EXPERIENTIA
SCHEPLER K L	1975	397	510	BIOCHIM BIOPHYS ACTA
SCHNEIDER Z	1966	14	7	B ACAD POL SCI
SCHNEIDER Z	1970	245	3388	J BIOL CHEM
SCHUTZ H	1984	139	366	ARCH MICROBIOL
SMILEY K L	1962	97	538	ARCH BIOCHEM BIOPHYS
SPRENGER G A	1989	135	1255	J GEN MICROBIOL <-
STROINSKI A	1974	162	321	ARCH BIOCHEM BIOPHYS
STROINSKI A	1979		1029	VITAMIN B12
TALARICO T L	1990	56	1195	APPL ENVIRON MICROB
TANIZAWA K	1987	42	353	Z NATURFORSCH C
TOBIMATSU T				UNPUB
TONG I T	1991	57	3541	APPL ENVIRON MICROB
TORAYA T	1980	203	174	ARCH BIOCHEM BIOPHYS
TORAYA T	1985	242	470	ARCH BIOCHEM BIOPHYS
TORAYA T	1976	69	475	BIOCHEM BIOPH RES CO

TORAYA T	1971	10	3475	BIOCHEMISTRY-US
TORAYA T	1974	13	3895	BIOCHEMISTRY-US
TORAYA T	1975	14	3949	BIOCHEMISTRY-US
TORAYA T	1979	18	417	BIOCHEMISTRY-US
TORAYA T	1988	27	7677	BIOCHEMISTRY-US
TORAYA T	1972	264	536	BIOCHIM BIOPHYS ACTA
TORAYA T	1982	2	233	B12
TORAYA T	1977	76	285	EUR J BIOCHEM
TORAYA T				IN PRESS BIOCH BIOPH
TORAYA T	1978	135	726	J BACTERIOL
TORAYA T	1979	139	39	J BACTERIOL
TORAYA T	1980	141	1439	J BACTERIOL
TORAYA T	1977	252	963	J BIOL CHEM
TORAYA T	1980	255	3520	J BIOL CHEM
TORAYA T	1983	258	9296	J BIOL CHEM
TORAYA T	1986	261	9289	J BIOL CHEM
TORAYA T	1987	262	8544	J BIOL CHEM
TORAYA T	1991	266	5430	J BIOL CHEM
TORAYA T				UNPUB
USHIO K	1984	788	318	BIOCHIM BIOPHYS ACTA
USHIO K	1982	28	225	J NUTR SCI VITAMINOL
VALINSKY J E	1974	96	4709	J AM CHEM SOC
VALINSKY J E	1974	249	2751	J BIOL CHEM
VOISENET C E	1918	32	476	ANN I PASTEUR
WAGNER O W	1966	241	1751	J BIOL CHEM
WILLETTS A	1979	588	302	BIOCHIM BIOPHYS ACTA
YAKUSHEVA M I	1974	60	293	ANAL BIOCHEM
YAKUSHEVA M I	1977	484	216	BIOCHIM BIOPHYS ACTA
YAMANE T	1966	113	362	ARCH BIOCHEM BIOPHYS
ZAGALAK B	1964	11	49	ACTA BIOCHIM POL
ZAGALAK B	1965	12	103	ACTA BIOCHIM POL
ZAGALAK B	1965	12	219	ACTA BIOCHIM POL
ZAGALAK B	1968	16	67	B ACAD POL SCI
ZAGALAK B	1966	241	3028	J BIOL CHEM

L20 ANSWER 8 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
AN 93:17810 SCISEARCH
GA The Genuine Article (R) Number: KE540
TI GROWTH TEMPERATURE-DEPENDENT ACTIVITY OF GLYCEROL DEHYDRATASE IN ESCHERICHIA-COLI EXPRESSING THE CITROBACTER-FREUNDII DHA REGULON
AU DANIEL R; GOTTSCHALK G (Reprint)
CS UNIV GOTTINGEN, INST MIKROBIOL, GRISEBACHSTR 8, W-3400 GOTTINGEN, GERMANY
CYA GERMANY
SO FEMS MICROBIOLOGY LETTERS, (15 DEC 1992) Vol. 100, No. 1-3, pp. 281-285. ISSN: 0378-1097. DT Article; Journal FS LIFE LA ENGLISH REC Reference Count: 13
AB Using the cosmid pWE15, a genomic library of Citrobacter freundii DNA in Escherichia coli ECL707 was prepared and screened for glycerol utilization. Six out of approximately 3000 clones were positive. One clone, harboring the recombinant cosmid pRD1, expressed glycerol dehydratase in high activity when grown at 28-degrees-C but not at 37-degrees-C. The growth temperature had little effect on the activity of the other enzymes encoded by the dha regulon. When the glycerol-containing medium was supplemented with corrinoids, the recombinant E. coli strain produced 1,3-propanediol in high amounts at 28-degrees-C.
CC MICROBIOLOGY
ST Author Keywords: CITROBACTER-FREUNDII; ESCHERICHIA-COLI ECL707; GLYCEROL DEHYDRATASE; 1,3-PROPANEDIOL; GLYCEROL FERMENTATION; DHA REGULON
STP KeyWords Plus (R): KLEBSIELLA-PNEUMONIAE; ANAEROBIC GROWTH; GENES
RF 92-3056 001; UPTAKE OF SURFACTANT PROTEIN-B; CASEIN KINASE-II; CATALYTIC SUBUNITS
92-4812 001; PUTATIVE ANAEROBIC COPROPORPHYRINOGEN-III OXIDASE IN RHODOBACTER-SPHAEROIDES; TRANSCRIPTIONAL REGULATORY ELEMENT; FUNCTIONAL EXPRESSION
RE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	
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BRADFORD M M	1976	72	248	ANAL BIOCHEM	
EGGSTEIN M	1974			METHODEN ENZYMATISCH	
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SPRENGER G A	1989	135	1255	J GEN MICROBIOL	<-
TONG I T	1991	57	3541	APPL ENVIRON MICROB	
TORAYA T	1977	76	285	EUR J BIOCHEM	
TORAYA T	1977	252	963	J BIOL CHEM	

L20 ANSWER 9 OF 9 SCISEARCH COPYRIGHT 1997 ISI (R)
AN 91:670800 SCISEARCH
GA The Genuine Article (R) Number: GT942
TI 1,3-PROPANEDIOL PRODUCTION BY ESCHERICHIA-COLI EXPRESSING GENES FROM THE KLEBSIELLA-PNEUMONIAE-DHA REGULON
AU TONG I T; LIAO H H; CAMERON D C (Reprint)
CS UNIV WISCONSIN, DEPT CHEM ENGN, 1415 JOHNSON DR, MADISON, WI, 53706;
UNIV WISCONSIN, CTR BIOTECHNOL, MADISON, WI, 53705 CYA USA
SO APPLIED AND ENVIRONMENTAL MICROBIOLOGY, (1991) Vol. 57, No. 12, pp. 3541-3546. DT Article; Journal FS LIFE; AGRI LA ENGLISH REC Reference Count: 33
AB The dha regulon in Klebsiella pneumoniae enables the organism to grow anaerobically on glycerol and produce 1,3-propanediol (1,3-PD). Escherichia coli, which does not have a dha system, is unable to grow anaerobically on glycerol without an exogenous electron acceptor and does not produce 1,3-PD. A genomic library of K. pneumoniae ATCC 25955 constructed in E. coli AG1 was enriched for the ability to grow anaerobically on glycerol and dihydroxyacetone and was screened for the production of 1,3-PD. The cosmid pTC1 (42.5 kb total with an 18.2-kb major insert) was isolated from a 1,3-PD-producing strain of E. coli and found to possess enzymatic activities associated with four genes of the dha regulon: glycerol dehydratase (dhaB), 1,3-PD oxidoreductase (dhaT), glycerol dehydrogenase (dhaD), and dihydroxyacetone kinase (dhaK). All four activities were inducible by the presence of glycerol. When E. coli AG1/pTC1 was grown on complex medium plus glycerol, the yield of 1,3-PD from glycerol was 0.46 mol/mol. The major fermentation by-products were formate, acetate, and D-lactate. 1,3-PD is an intermediate in organic synthesis and polymer production. The 1,3-PD fermentation provides a useful model system for studying the interaction of a biochemical pathway in a foreign host and for developing strategies for metabolic pathway engineering.
CC MICROBIOLOGY; BIOTECHNOLOGY & APPLIED MICROBIOLOGY
STP KeyWords Plus (R): GLYCEROL; DISSIMILATION; DEHYDRATASES; COENZYME; KINASE
RF 91-1515 001; PHYSICAL MAP OF THE ESCHERICHIA-COLI CHROMOSOME; METZ GENE ENCODING TRANSFER-RNA MET F1; ASC (FORMERLY SAC) OPERON
RE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)
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BAILEY J E	1991	252	1668	SCIENCE
CAMERON D C	1990			P CORN UT C ST LOU
COZZARELLI N R	1965	90	1325	J BACTERIOL
DANIELS L	1975	90	1325	APPL BACTERIOL
ELM R	1980	19	425	ULLMANNS ENCY TECHNI
FORAGE R G	1979	569	249	BIOCHIM BIOPHYS ACTA
FORAGE R G	1982	149	413	J BACTERIOL
FORAGE R G	1982	151	591	J BACTERIOL
HONDA S	1980	143	1458	J BACTERIOL
JOHNSON E A	1984	160	55	J BACTERIOL
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PAWELKIEWICZ J	1965	12	207	ACTA BIOCHIM POL
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STROINSKI A	1974	162	321	ARCH BIOCHEM BIOPHYS
TEMPEST D W	1987		797	ESCHERICHIA COLI SAL
TORAYA T	1982		233	B12 BIOCH MED
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DIALOG INFORMATION SERVICES

09dec97 12:47:19 User208600 Session D1120.1

File 301:CHEMNAME(R) 1957-1997/Nov (c) 1997 Amer.Chem.Soc.

S1 1 GLYCEROL(W)DEHYDRATASE
S2 1 DIOL(W)DEHYDRATASE

SYSTEM:OS - DIALOG OneSearch
File 155:MEDLINE(R) 1966-1997/Dec W4 (c) format only 1997 Knight-Ridder Info
File 5:BIOSIS PREVIEWS(R) 1969-1997/Dec W1 (c) 1997 BIOSIS
File 73:EMBASE 1974-1997/Nov W3 (c) 1997 Elsevier Science B.V.
File 351:DERWENT WPI 1963-1997/UD=9748;UP=9745;UM=9743 (c)1997 Derwent Info Ltd

Set	Items	Description
S1	240	ADENOSYLCOBALAMIN()DEPENDENT()DIOL()DEHYDRASE + COENZYME() B12()DEPENDENT()DIOL()DEHYDRASE + COENZYME()B12()DEPENDENT()DIOL()DEHYDRATASE + DEHYDRATASE()DIOL + DIOL()DEHYDRASE + DIOL()DEHYDRATASE + MESO()2()3()BUTANEDIOL()DEHYDRASE
S2	117	PROPANEDIOL()DEHYDRASE + PROPANEDIOL()DEHYDRATASE + 1()2()PROPANEDIOL()DEHYDRATASE
S3	280	S1:S2
S4	191	COENZYME()B12()DEPENDENT()GLYCEROL()DEHYDRATASE + GLYCEROL()DEHYDRASE + GLYCEROL()DEHYDRATASE
S5	156571	KLEBSIELLA OR CITROBACTER OR LACTOBACILLUS OR ENTEROBACTEROR PELOBACTER OR ILYOBACTER OR CLOSTRIDIUM
S6	138	S3 AND S5
S7	105	RD (unique items)
S8	90	S4 AND S5 NOT S6
S9	64	RD (unique items)

7/6/1 (Item 1 from file: 155) 09142159 97296406
Kinetic investigations with inhibitors that mimic theposthomolysis intermediate in the reactions of coenzyme-B12-dependentglycerol dehydratase and diol dehydratase.

7/6/2 (Item 2 from file: 155) 08960494 97157051
An electron paramagnetic resonance study on the mechanism-based inactivation ofadenosylcobalamin-dependentdiol dehydrase by glycerol and other substrates.

7/6/3 (Item 3 from file: 155) 08791004 96394290
Cloning, sequencing, and high level expression of the genes encodingadenosylcobalamin-dependent glyceroldehydrase of Klebsiellapneumoniae.

7/6/4 (Item 4 from file: 155) 08790962 96422012
Cloning, sequencing, and overexpression of the genes encoding coenzyme B12-dependent glyceroldehydratase of Citrobacter freundii.

7/6/5 (Item 5 from file: 155) 08213743 95221362
Molecular cloning, sequencing, and expression of the genes encodingadenosylcobalamin-dependentdiol dehydrase of Klebsiellaoxytoca.

7/6/6 (Item 6 from file: 155) 07662694 94015511
Importance of the nucleotide loop moiety coordinated to the cobalt atom ofadenosylcobalamin forcoenzymic function in thediol dehydrase reaction.

7/6/7 (Item 7 from file: 155) 07487018 93160191
Adenosylcobinamide methyl phosphate as apseudocoenzyme for diol dehydrase.

7/6/8 (Item 8 from file: 155) 06454075 90165470
Essential histidine residues in coenzyme B12-dependentdiol dehydrase: dye-sensitizedphotooxidation and ethoxycarbonylation.

7/6/9 (Item 9 from file: 155) 06216664 87092400
Solubilization of a membrane-bounddiol dehydratase with retention of EPR g = 2.02 signal by using 2-(Ncyclohexylamino)ethanesulfonic acid buffer.

7/6/10 (Item 10 from file: 155) 06148838 87265998
Re-investigation of the protein structure of coenzyme B12-dependentdiol dehydrase.

7/6/11 (Item 11 from file: 155) 06130099 86129441
Diol metabolism anddiol dehydratase in Clostridiumglycolicum.

7/6/12 (Item 12 from file: 155) 06086412 88107822
Roles of the beta-D-ribofuranose ring and the functional groups of the D-ribose moiety ofadenosylcobalamin in thediol dehydratase reaction.

7/6/13 (Item 13 from file: 155) 05575726 89207091
[Studies on the biological function of the nucleotide base of vitamin B12] Untersuchungen zur biologischen Funktion der Nucleotidbase von Vitamin B12.

7/6/14 (Item 14 from file: 155) 05554022 88198006
Anaerobic metabolism of the L-rhamnose fermentation product 1,2-propanediol in Salmonellatyphimurium.

7/6/15 (Item 15 from file: 155) 05314924 87250467
Activation and cleavage of the carbon-cobalt bond ofadeninylethylcobalamin bydiol dehydrase.

7/6/16 (Item 16 from file: 155) 05279470 86250875
The synthesis of adenine-modified analogs ofadenosylcobalamin and theircoenzymic function in the reaction catalyzed bydiol dehydrase.

7/6/17 (Item 17 from file: 155) 04855866 86049396
The binding site for the adenosyl group of coenzyme B12 indiol dehydrase.

7/6/18 (Item 18 from file: 155) 04410929 80182104
The synthesis and properties of four spin-labeled analogs ofadenosylcobalamin.

7/6/19 (Item 19 from file: 155) 03879299 82066866
Chemical modification of coenzyme B12-dependent diol dehydrase with pyridoxal 5'-phosphate: lysyl residue essential for interaction between two components of the enzyme.

7/6/20 (Item 20 from file: 155) 03841000 83074700
Diol dehydratase: N-terminal amino acid sequences and subunit stoichiometry.

7/6/21 (Item 21 from file: 155) 03837227 83032742
The mechanism of insutu reactivation of glycerol-inactivated coenzyme B12-dependent enzymes, glyceroldehydratase and diol dehydratase.

7/6/22 (Item 22 from file: 155) 03818946 82119943
Glycerol fermentation inKlebsiellapneumoniae: functions of the coenzyme B12-dependent glycerol anddiol dehydratases.

7/6/23 (Item 23 from file: 155) 03817061 82099691
[The molecular basis of manifestation of function for vitamin B12 coenzymes (author'transl)]

7/6/24 (Item 24 from file: 155) 03814098 82066743
Reactive sulfhydryl groups of coenzyme B12-dependentdiol dehydrase: differential modification of essential and nonessential ones.

7/6/25 (Item 25 from file: 155) 03810110 82023979
Purification and subunit characterization of propanediol dehydratase, a membrane-associated enzyme.

7/6/26 (Item 26 from file: 155) 03790172 81085020
Coenzyme B12-dependent diol dehydrase: chemical modification with 2,3-butanedione and phenylglyoxal.

7/6/27 (Item 27 from file: 155) 03783569 81006730
In situ reactivation of glycerol-inactivated coenzyme B12-dependent enzymes, glycerol dehydratase and diol dehydratase.

7/6/28 (Item 28 from file: 155) 03782938 80264192
Inactivation of diol dehydrase in the presence of a coenzyme-B12 analog.

7/6/29 (Item 29 from file: 155) 03775514 80159971
The synthesis of several immobilized derivatives of vitamin B12 coenzyme and their use as affinity adsorbents for a study of interactions of diol dehydrase with the coenzyme.

7/6/30 (Item 30 from file: 155) 03775503 80159893
Distribution of coenzyme B12-dependent diol dehydratase and glycerol dehydratase in selected genera of Enterobacteriaceae and Propionibacteriaceae.

7/6/31 (Item 31 from file: 155) 03260264 79231445
Stereospecificity and mechanism of adenosylcobalamin-dependent diol dehydratase. Catalysis and inactivation with meso- and dl-2,3-butanediols as substrates.

7/6/32 (Item 32 from file: 155) 03115235 79124674
Role of peripheral side chains of vitamin B12 coenzymes in the reaction catalyzed by diol dehydrase.

7/6/33 (Item 33 from file: 155) 03108208 78242158
Coenzyme B12-dependent diol dehydratase: regulation of apoenzyme synthesis in Klebsiella pneumoniae (Aerobacter aerogenes) ATCC 8724.

7/6/34 (Item 34 from file: 155) 02985254 77225263
Immunochemical evidence for the difference between coenzyme-B12-dependent diol dehydratase and glycerol dehydratase.

7/6/35 (Item 35 from file: 155) 02963505 80000580
Resolution of the coenzyme B-12-dependent dehydratases of Klebsiella sp. and Citrobacter freundii.

7/6/36 (Item 36 from file: 155) 02963490 80000417
Hydrogen transfer in catalysis by adenosylcobalamin-dependent diol dehydratase.

7/6/37 (Item 37 from file: 155) 02959767 79216215
Fermentation of 1,2-propanediol with 1,2-ethanediol by some genera of Enterobacteriaceae, involving coenzyme B12-dependent diol dehydratase.

7/6/38 (Item 38 from file: 155) 02956999 79186157
Coenzyme B12-dependent diol dehydrase: purification, subunit heterogeneity, and reversible association.

7/6/39 (Item 39 from file: 155) 02908486 77134713
Mechanism of action of adenosylcobalamin: glycerol and other substrate analogues as substrates and inactivators for propanediol dehydratase--kinetics, stereospecificity, and mechanism.

7/6/40 (Item 40 from file: 155) 02907797 77118572
Studies on the mechanism of the adenosylcobalamin-dependent diol dehydrase reaction by the use of analogs of the coenzyme.

7/6/41 (Item 41 from file: 155) 02313562 75146954
Preparation, properties and biological activities of succinyl derivatives of vitamin B12.

7/6/42 (Item 42 from file: 155) 02143923 76184142
Substrate specificity of coenzyme B12-dependent diol dehydrase: glycerol as both a good substrate and a potent inactivator.

7/6/43 (Item 43 from file: 155) 02058873 76039896
Immobilized diol dehydrase and its use in studies of cobalamin binding and subunit interaction.

7/6/44 (Item 44 from file: 155) 02002592 75146949
Ethanolamine ammonia-lyase: inactivation of the holoenzyme by N2O and the mechanism of action of Coenzyme B12.

7/6/45 (Item 45 from file: 155) 01430076 75008121
Coenzyme B12 dependent diol dehydrase system. Dissociation of the enzyme into two different protein components and some properties of the components.

7/6/46 (Item 46 from file: 155) 01317779 74031427
Activation of diol dehydrase by formamidinium or guanidinium ion, polyatomic monovalent cations having sp2 nitrogen.

7/6/47 (Item 47 from file: 155) 01276156 73196460
Dissociation of diol dehydrase into two different protein components.

7/6/48 (Item 48 from file: 155) 01201378 73047392
Coenzyme B 12 -dependent propanediol dehydratase systems. Ternary complex between apoenzyme, coenzyme, and substrate analog.

7/6/49 (Item 49 from file: 155) 01158359 72238147
Coenzyme B 12 dependent propanediol dehydratase system. Nature of cobalamin binding and some properties of apoenzyme-coenzyme B 12 analog complexes.

7/6/50 (Item 50 from file: 155) 00961699 72040213
Propanediol dehydratase system. Role of monovalent cations in binding of vitamin B 12 coenzyme or its analogs to apoenzyme.

7/6/51 (Item 51 from file: 155) 00495878 70000235
Ternary complex formation of 1,2-propanediol dehydratase, cobamide coenzyme and substrate analogue.

7/6/52 (Item 52 from file: 155) 00227137 68011874
Coenzyme activity of 5'-chlorocobalamin (10-Cl-DBCC) in propanediol dehydratase system.

7/6/53 (Item 53 from file: 155) 00143034 67173019
[On the mechanism of the propanediol dehydrase reaction] Zum Mechanismus der Propandioldehydrase-Reaktion.

7/6/54 (Item 54 from file: 155) 00102610 67052680
[On the stereochemistry of the propanediol dehydrase reaction] Zur Stereochemie der Propandioldehydrase-Reaktion.

7/6/55 (Item 1 from file: 5) 13011721 BIOSIS Number: 99011721
Carbon and electron flow in Clostridium butyricum grown in chemostat culture on glycerol and on glucose Print Number: Biological Abstracts Vol. 102ss. 001 Ref. 011721

7/6/56 (Item 2 from file: 5) 11049541 BIOSIS Number: 97249541
Diol dehydrase and glycerol dehydrase, coenzyme B-12-dependent isozymes Print Number: Biological Abstracts/RRM Vol. 048ss. 006 Ref. 082721

7/6/57 (Item 3 from file: 5) 11049540 BIOSIS Number: 97249540
Diol dehydrase from Clostridium glycolicum: The non-B-12-dependent enzyme Print Number: Biological Abstracts/RRM Vol. 048ss. 006 Ref. 082720

7/6/58 (Item 4 from file: 5) 11049533 BIOSIS Number: 97249533
Metal Ions in Biological Systems, Vol. 30Metalloenzymes involving amino acid-residue and related radicals Print Number: Biological Abstracts/RRM Vol. 048ss. 006 Ref. 082713

7/6/59 (Item 5 from file: 5) 9567450 BIOSIS Number: 94072450
ENZYMES INVOLVED IN ANAEROBIC POLYETHYLENE GLYCOL DEGRADATION BY PELOBACTER-VENETIANUS AND BACTEROIDES STRAIN PG1

7/6/60 (Item 6 from file: 5) 5816885 BIOSIS Number: 83079192
SOLUBILIZATION OF A MEMBRANE-BOUND DIOL DEHYDRATASE WITH RETENTION OF EPR G EQUALS 2.02 SIGNAL BY USING 2-N CYCLOHEXYLAMINOETHANESULFONIC ACID BUFFER

7/6/61 (Item 7 from file: 5) 5447256 BIOSIS Number: 82092059
CHARACTERIZATION OF THE ENZYME INVOLVED IN FORMATION OF 2 BUTANOL FROM MESO-2 3 BUTANEDIOL BY LACTIC-ACID BACTERIA

7/6/62 (Item 8 from file: 5) 5150605 BIOSIS Number: 31039920
SOLUBILIZATION OF MEMBRANE-BOUND AND OXYGEN SENSITIVE ENZYMES WITH 2-N CYCLOHEXYLAMINOETHANESULFONIC-ACID

7/6/63 (Item 9 from file: 5) 5104752 BIOSIS Number: 30117059
SOLUBILIZATION OF DIOL DEHYDRATASE FROM CLOSTRIDIUM-GLYCOLICUM

7/6/64 (Item 10 from file: 5) 4792137 BIOSIS Number: 79034452
COENZYMIC FUNCTION OF 1 SUBSTITUTED OR N-6 SUBSTITUTED ANALOGS OF ADENOSYLCOBALAMIN IN THE DIOL DEHYDRATASE EC-4.2.1.28 REACTION

7/6/65 (Item 11 from file: 5) 4650225 BIOSIS Number: 29007540
DIOL DEHYDRATASE AND GLYCOL METABOLISM IN CLOSTRIDIUM-GLYCOLICUM

7/6/66 (Item 12 from file: 5) 4440303 BIOSIS Number: 78014126
LIGAND EXCHANGE REACTIONS OF DIOL DEHYDRASE EC-4.2.1.28 BOUND COBALAMINS AND THE EFFECT OF THE NUCLEOSIDE BINDING

7/6/67 (Item 13 from file: 5) 4071486 BIOSIS Number: 76021337
DIOL DEHYDRATASE EC-4.2.1.28 N TERMINAL AMINO-ACID SEQUENCES AND SUBUNIT STOICHIOMETRY

7/6/68 (Item 14 from file: 5) 4027710 BIOSIS Number: 75075069
THE MECHANISM OF IN-SITU REACTIVATION OF GLYCEROL INACTIVATED COENZYME B-12 DEPENDENT ENZYMES GLYCEROL DEHYDRATASE EC-4.2.1.30 AND DIOL DEHYDRATASE EC-4.2.1.28

7/6/69 (Item 15 from file: 5) 3664154 BIOSIS Number: 73056521
REACTIVE SULFHYDRYL GROUPS OF COENZYME B-12 DEPENDENT DIOL DEHYDRASE EC-4.2.1.28 DIFFERENTIAL MODIFICATION OF ESSENTIAL AND NONESSENTIAL ONES

7/6/70 (Item 16 from file: 5) 3642292 BIOSIS Number: 73034659
PURIFICATION AND SUBUNIT CHARACTERIZATION OF PROPANEDIOL DEHYDRATASE EC-4.2.1.28 A MEMBRANE ASSOCIATED ENZYME

7/6/71 (Item 17 from file: 5) 3318561 BIOSIS Number: 71040960
COENZYME B-12 DEPENDENT DIOL DEHYDRASE EC-4.2.1.28 CHEMICAL MODIFICATION WITH 2 3 BUTANEDIONE AND PHENYL GLYOXAL

7/6/72 (Item 18 from file: 5) 3237789 BIOSIS Number: 21030192
STRUCTURE FUNCTION RELATIONSHIP OF VITAMIN B-12 COENZYME ADENOSYL COBALAMIN IN THE DIOL DEHYDRASE EC-4.2.1.28 SYSTEM

7/6/73 (Item 19 from file: 5) 3086882 BIOSIS Number: 70036789
THE SYNTHESIS OF SEVERAL IMMOBILIZED DERIVATIVES OF VITAMIN B-12 COENZYME AND THEIR USE AS AFFINITY ADSORBENTS FOR A STUDY OF INTERACTIONS OF DIOL DEHYDRASE EC-4.2.1.28 WITH THE COENZYME

7/6/74 (Item 20 from file: 5) 2974674 BIOSIS Number: 69012081
FERMENTATION OF 1 2 PROPANEDIOL AND 1 2 ETHANEDIOL BY SOME GENERA OF ENTEROBACTERIACEAE INVOLVING COENZYME B-12 DEPENDENT DIOL DEHYDRATASE EC-4.2.1.28

7/6/75 (Item 21 from file: 5) 2801475 BIOSIS Number: 68056382
COENZYME B-12 DEPENDENT DIOL DEHYDRASE EC-4.2.1.28 PURIFICATION SUBUNIT HETEROGENEITY AND REVERSIBLE ASSOCIATION

7/6/76 (Item 22 from file: 5) 2788680 BIOSIS Number: 68043587
STEREOSPECIFICITY AND MECHANISM OF ADENOSYL COBALAMIN DEPENDENT DIOL DEHYDRATASE CATALYSIS AND INACTIVATION WITH MESO 2 3 BUTANEDIOL AND RACEMIC 2 3 BUTANEDIOL AS SUBSTRATES

7/6/77 (Item 23 from file: 5) 2756523 BIOSIS Number: 68011430
ROLE OF PERIPHERAL SIDE CHAINS OF VITAMIN B-12 COENZYMES IN THE REACTION CATALYZED BY DIOL DEHYDRASE EC-4.2.1.28

7/6/78 (Item 24 from file: 5) 2684235 BIOSIS Number: 67021638
METABOLISM OF 1 2 PROPANEDIOL BY METHANOL UTILIZING BACTERIA AND SOME PROPERTIES OF 1 2 PROPANEDIOL DEHYDROGENATING ENZYME

7/6/79 (Item 25 from file: 5) 2526149 BIOSIS Number: 66073054
COENZYME B-12 DEPENDE NT DIOL DEHYDRATASE EC-4.2.1.28 REGULATION OF APOENZYME SYNTHESIS IN KLEBSIELLA-PNEUMONIAE AEROBACTER-AEROGENES ATCC-8724

7/6/80 (Item 26 from file: 5) 2501151 BIOSIS Number: 66048056
MECHANISM OF ACTION OF ADENOSYL COBALAMIN HYDROGEN TRANSFER IN THE INACTIVATION OF DIOL DEHYDRATASE EC-4.2.1.28 BY GLYCEROL

7/6/81 (Item 27 from file: 5) 2377808 BIOSIS Number: 65004216
IMMUNOCHEMICAL EVIDENCE FOR THE DIFFERENCE BETWEEN COENZYME B-12 DEPENDENT DIOL DEHYDRATASE EC-4.2.1.28 AND GLYCEROL DEHYDRATASE EC-4.2.1.30

7/6/82 (Item 28 from file: 5) 2183678 BIOSIS Number: 64010598
MECHANISM OF ACTION OF ADENOSYL COBALAMIN GLYCEROL AND OTHER SUBSTRATE ANALOGS AS SUBSTRATES AND INACTIVATORS FOR PROPANEDIOL DEHYDRATASE EC-4.2.1.28 KINETICS STEREOSPECIFICITY AND MECHANISM

7/6/83 (Item 29 from file: 5) 2166587 BIOSIS Number: 63071007
STUDIES ON THE MECHANISM OF THE ADENOSYL COBALAMIN DEPENDENT DIOL DEHYDRASE EC-4.2.1.28 REACTION BY THE USE OF ANALOGS OF THE COENZYME

7/6/84 (Item 30 from file: 5) 1721539 BIOSIS Number: 60066107
A PHYSICAL EXPLANATION OF THE EPR SPECTRUM OBSERVED DURING CATALYSIS BY ENZYMES UTILIZING COENZYME B-12

7/6/85 (Item 31 from file: 5) 1677514 BIOSIS Number: 60022082
ETHANOL AMINE AMMONIA LYASE INACTIVATION OF THE HOLO ENZYME BY NITROGEN OXIDE AND THE MECHANISM OF ACTION OF COENZYME B-12

7/6/86 (Item 32 from file: 5) 1671435 BIOSIS Number: 60016003
RELATIVE ENANTIOMER BINDING AND REACTION RATES WITH PROPANEDIOL DEHYDRASE EC-4.2.1.28

7/6/87 (Item 33 from file: 5) 1083898 BIOSIS Number: 55013830
FORMATION OF 5 DEOXYADENOSYL DERIVATES OF COBALAMIN C LACTAM AND COBALAMIN C LACTONE BY PROPIONIBACTERIUM-SHERMANII IN-VIVO AND IN-VITRO

7/6/88 (Item 1 from file: 73) 10002807 EMBASE No: 96181477
Evidence for enantiomorphic-enantiotopic group discrimination inthiol dehydratase-catalyzed dehydration of meso-2,3-butanediol

7/6/89 (Item 2 from file: 73) 9133324 EMBASE No: 94072716
The synthesis of a pyridyl an alog ofadenosylcobalamin and itscoenzymic function in the diol dehydratase reaction

7/6/90 (Item 3 from file: 73) 8280211 EMBASE No: 91302965
Roles of the D-ribose and 5,6-dimethylbenzimidazole moieties of the nucleotide loop ofdenosylcobalamin in manifestation ofcoenzymic functionin thediol dehydrase reaction

7/6/91 (Item 4 from file: 73) 7247646 EMBASE No: 88247524
Acceleration of cleavage of th e carbon-cobalt bond ofsterically hindered alkylcobalamins by binding toapoprotein of diol dehydrase

7/6/92 (Item 5 from file: 73) 6031502 EMBASE No: 86026562
The binding site for theadenosyl group of coenzyme Bsub 1sub 2 in diol dehydrase

7/6/93 (Item 6 from file: 73) 5754272 EMBASE No: 84249938
Propanediol-1,2-dehydratase and metabolism of glycerol of Lactobacillusbrevis

7/6/94 (Item 7 from file: 73) 5710823 EMBASE No: 84206489
Coenzymic function of 1- or Nsup 6-substituted analogs of adenosylcobalamin in thediol dehydratase reaction

7/6/95 (Item 8 from file: 73) 5125653 EMBASE No: 82130576
Glycerol fermentation inKlebsiellapneumoniae: Functions of the coenzyme Bsub 1sub 2-dependent glycerol and diol dehydratases

7/6/96 (Item 9 from file: 73) 2260075 EMBASE No: 81031200
In situ reactivation of glyc erol-inactivated coenzyme Bsub 1sub2-dependent enzymes, glycerol dehydratase and diol dehydratase

7/6/97 (Item 10 from file: 73) 1232941 EMBASE No: 79000296

Coenzyme Bsub 1sub 2- depe ndent diol dehydratase: regulation of apoenzymesyn[redacted]Klebsiella pneumoniae (Aerobacter aerogenes) ATCC 8724

7/6/98 (Item 11 from file: 73) 949780 EMBASE No: 78117989
Immunochemical evidence for the difference between coenzyme Bsub 1sub 2 dependent diol dehydratase and glycerol dehydratase

7/6/99 (Item 12 from file: 73) 616302 EMBASE No: 76203083
Mechanism of action of adenosylcobalamin: 3fluoro 1,2 propanediol as substrate for propanediol dehydrase. Mechanistic implications

7/6/100 (Item 13 from file: 73) 556098 EMBASE No: 76140982
Coenzyme action of adenosyl 13 epicobalamin in thediol dehydrase system

7/6/101 (Item 14 from file: 73) 537094 EMBASE No: 76121511
A physical explanation of the EPR spectrum observed during catalysis by enzymes utilizing coenzyme Bsub 1sub 2

7/6/102 (Item 15 from file: 73) 427247 EMBASE No: 76007141
Relative enantiomer binding and reaction rates withpropanediol dehydrase

7/6/103 (Item 16 from file: 73) 326271 EMBASE No: 75119035
Coenzyme Bsub 1sub 2 dependent diol dehydrase system. Dissociation of the enzyme into two different protein components and some properties of the components

7/6/104 (Item 1 from file: 351) 011021737 WPIAcc No: 96-518687/199651
Fermentative prodn. of 1,3-propane-diol useful for polymerprodn. - from carbon substrates using mixed culture of glycerol-producing and diol-producing organisms

7/6/105 (Item 2 from file: 351) 011021733 WPIAcc No: 96-518683/199651
Cosmid contg. Klebsiella pneumoniae gene for diol dehydratase - and related transformed microorganisms able to convert glycerol to 1,3-propanediol for polymerprodn

7/7/3 (Item 3 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
08791004 96394290
Cloning, sequencing, and high level expression of the genes encoding adenosylcobalamin-dependent glycerol dehydrase of Klebsiella pneumoniae.
Tobimatsu T; Azuma M; Matsubara H; Takatori H; Niida T; Nishimoto K; Satoh H; Hayashi R; Toraya T
Department of Bioscience and Biotechnology, Faculty of Engineering, Okayama University, Tsushima-Naka, Okayama 700, Japan.
J Biol Chem (UNITED STATES) Sep 13 1996, 271 (37) p22352-7, ISSN 0021-9258 Journal Code: HIV Languages: ENGLISH Document type: JOURNAL ARTICLE
The gld genes encoding adenosylcobalamin-dependent glycerol dehydrase of Klebsiella pneumoniae were cloned by cross-hybridization with a DNA fragment of Klebsiella oxytoca diol dehydrase genes. Since the Escherichia coli clones isolated did not show appreciable enzyme activity, plasmids for high level expression of cloned genes were constructed. The enzyme expressed in E. coli was indistinguishable from the wild-type glycerol dehydrase of K. pneumoniae by the criteria of polyacrylamide gel electrophoretic, immunochemical, and catalytic properties. It was also shown that the recombinant functional enzyme consists of Mr 61,000, 22,000, and 16, 000 subunits. Sequence analysis of the genes revealed four open reading frames separated by 2-12 bases. The sequential three open reading frames from the first to the third (gldA, gldB, and gldC genes) encoded polypeptides of 555, 194, and 141 amino acid residues with predicted molecular weights of 60,659(alpha), 21,355(beta), and 16,104(gamma),respectively. High level expression of these three genes in E. coli produced more than 14-fold higher level of fully active apoenzyme than that in K. pneumoniae. It was thus concluded that these are the genes encoding the subunits of glycerol dehydrase. The deduced amino acid sequences of the
three subunits were 71, 58, and 54% identical with those of the alpha, beta, and gamma subunits of diol dehydrase, respectively, but failed to show any apparent homology with other proteins.

7/7/4 (Item 4 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
08790962 96422012
Cloning, sequencing, and overexpression of the genes encoding coenzyme B12-dependent glycerol dehydratase of Citrobacter freundii.
Seyfried M; Daniel R; Gottschalk G
Institut fur Mikrobiologie der Georg-August-Universitat, Gottingen, Germany.
J Bacteriol (UNITED STATES) Oct 1996, 178 (19) p5793-6, ISSN 0021-9193 Journal Code: HH3 Languages: ENGLISH Document type: JOURNAL ARTICLE
The genes encoding coenzyme B12-dependent glycerol dehydratase of Citrobacter freundii were cloned and overexpressed in Escherichia coli. The B12-free enzyme was purified to homogeneity. It consists of three types of subunits whose N-terminal sequences are in accordance with those deduced from the open reading frames dhaB, dhaC, and dhaE, coding for subunits of 60,433 (alpha), 21,487 (beta), and 16,121 (gamma) Da, respectively. The enzyme complex has the composition alpha2beta2gamma2. Amino acid alignments with the subunits of the recently sequenced diol dehydratase of Klebsiella oxytoca (T. Tobimatsu, T. Hara, M. Sakaguchi, Y. Kishimoto, Y. Wada, M. Isoda, T. Sakai, and T. Toraya, J. Biol. Chem. 270:7142-7148, 1995) revealed identities between 51.8 and 70.9%.

7/7/5 (Item 5 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
08213743 95221362
Molecular cloning, sequencing, and expression of the genes encoding adenosylcobalamin-dependent diol dehydrase of Klebsiella oxytoca.
Tobimatsu T; Hara T; Sakaguchi M; Kishimoto Y; Wada Y; Isoda M; Sakai T; Toraya T
Department of Biotechnology, Faculty of Engineering, Okayama University, Japan.
J Biol Chem (UNITED STATES) Mar 31 1995, 270 (13) p7142-8, ISSN 0021-9258 Journal Code: HIV Languages: ENGLISH Document type: JOURNAL ARTICLE
The pdd genes encoding adenosylcobalamin-dependent diol dehydrase of Klebsiella oxytoca were cloned by using a synthetic oligodeoxyribonucleotide as a hybridization probe followed by measuring the enzyme activity of each clone. Five clones of Escherichia coli exhibited diol dehydrase activity. At least one of them was shown to express diol dehydrase genes under control of their own promoter. Sequence analysis of the DNA fragments found in common in the inserts of these five clones and the flanking regions revealed four open reading frames separated by 10-18 base pairs. The sequential three open reading frames from the second to the fourth (pddA, pddB, and pddC genes) encoded polypeptides of 554, 224, and 173 amino acid residues with predicted molecular weights of 60,348 (alpha), 24,113 (beta), and 19,173 (gamma), respectively. Overexpression of these three genes in E. coli produced more than 50-fold higher level of functional apodiol dehydrase than that in K. oxytoca. The recombinant enzyme was indistinguishable from the wild-type one of K. oxytoca by the criteria of polyacrylamide gel electrophoretic and immunochemical properties. It was thus concluded that these three gene products are the subunits of functional diol dehydrase. Comparisons of the deduced amino acid sequences of the three subunits with other proteins failed to reveal any apparent homology.

7/7/11 (Item 11 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
06130099 86129441
Diol metabolism and diol dehydratase in Clostridium glycolicum.
Hartmanis MG; Stadtman TC
Arch Biochem Biophys (UNITED STATES) Feb 15 1986, 245 (1) p144-52, ISSN 0003-9861 Journal Code: 6SK Languages: ENGLISH Document type: JOURNAL ARTICLE
Levels of the five enzymes involved in the fermentation of 1,2-ethanediol and 1,2-propanediol in the strictly anaerobic bacterium, Clostridium glycolicum, were investigated. All enzymes with the exception of the first enzyme in the pathway, diol dehydratase, were found to be constitutive, stable to exposure to oxygen, and present in the cytosol. Diol dehydratase was found to be extremely oxygen sensitive and strongly associated with the cell membrane. Treatment with ionic and nonionic detergents, butanol, phospholipase A2, or osmotic shock procedures failed to solubilize any diol dehydratase activity. Limited proteolysis using subtilisin released small amounts of activity. Diol dehydratase was found to be specific for 1,2-ethanediol and 1,2-propanediol and required the addition of a reducing agent for maximal activity. The enzyme was strongly inhibited by low concentrations of EDTA, ethylene glycol bis(beta-aminoethyl ether)-N,N,N',N'-tetraacetic acid, o-phenanthroline, hydroxylamine, hydroxyurea, and sulfhydryl reagents. Addition of adenosylcobalamin or high levels of intrinsic factor did not affect the reaction rate. Irradiation with light also did not inhibit the enzyme activity. These results suggest that the catalytic mechanism of diol dehydratase from C. glycolicum does not involve acobamide coenzyme.

7/7/22 (Item 22 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
03818946 82119943
Glycerol fermentation in Klebsiella pneumoniae: functions of the coenzyme B12-dependent glycerol and diol dehydratases.
Forage RG; Foster MA
J Bacteriol (UNITED STATES) Feb 1982, 149 (2) p413-9, ISSN 0021-9193 Journal Code: HH3 Languages: ENGLISH Document type: JOURNAL ARTICLE
Glycerol and diol dehydratases are inducible, coenzyme B12-dependent enzymes found together in Klebsiella pneumoniae ATCC 25955 during anaerobic growth on glycerol. Mutants of this strain isolated by a novel procedure were separately constitutive for either dehydratase, showing the structural genes for the two enzymes to be under independent control in vivo. Glycerol dehydratase and a trimethylene glycol dehydrogenase were implicated as members of a pleiotropic control system that includes glycerol dehydrogenase and dihydroxyacetone kinase for the anaerobic dissimilation of glycerol (the "dha system"). The dehydratase and dehydrogenases were induced by dihydroxyacetone and were jointly constitutive in mutants isolated as constitutive for either the dha system or glycerol dehydratase. These data and the stimulation of growth by Co2+ suggested that glycerol dehydratase and trimethylene glycol dehydrogenase are obligatory enzymes for anaerobic growth on glycerol as the sole carbon source.

7/7/56 (Item 2 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
11049541 BIOSIS Number: 97249541
Diol dehydrase and glycerol dehydrase, coenzyme B-12-dependent isozymes
Toraya T
Dep. Biotechnol., Fac. Eng., Okayama Univ., 3-1-1 Tsushima-Naka, Okayama 700, JAP 0 (0). 1994. 217-254. Full Journal Title: Sigel, H. and A. Sigel (Ed.). Metal Ions in Biological Systems, Vol. 30. Metalloenzymes involving amino acid-residue and related radicals. xxxv+494p. Marcel Dekker, Inc.: New York, New York, USA; Basel, Switzerland. ISBN 0-8247-9093-6. ISSN: 0161-5149
Language: ENGLISH Print Number: Biological Abstracts/RRM Vol. 046 Iss. 006 Ref. 082721

7/7/57 (Item 3 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.

11049540 BIOSIS Number: 97249540
Diol dehydrase from Clostridium glycolicum: The non-B-12-dependent enzyme
Hartmanis M G N
Kabi Pharmacia BioSci. Cent., Strandhergsgatan 49, S-11287 Stockholm, SWE 0 (0). 1994. 201-215. Full Journal Title: Sigel, H. and A. Sigel (Ed.). Metal Ions in Biological Systems, Vol. 30. Metalloenzymes involving amino acid-residue and related radicals. xxxv+494p. Marcel Dekker, Inc.: New York, New York, USA; Basel, Switzerland. ISBN 0-8247-9093-6. ISSN: 0161-5149
Language: ENGLISH Print Number: Biological Abstracts/RRM Vol. 046 Iss. 006 Ref. 082720

7/7/58 (Item 4 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
11049533 BIOSIS Number: 97249533
Metal Ions in Biological Systems, Vol. 30. Metalloenzymes involving amino acid-residue and related radicals
Sigel H; Sigel A
Inst. Inorg. Chem., Univ. Basel, CH-4056 Basel, SWI 0 (0). 1994. XXXV+494P. Full Journal Title: Sigel, H. and A. Sigel (Ed.). Metal Ions in Biological Systems, Vol. 30. Metalloenzymes involving amino acid-residue and related radicals. xxxv+494p. Marcel Dekker, Inc.: New York, New York, USA; Basel, Switzerland. ISBN 0-8247-9093-6. ISSN: 0161-5149
Language: ENGLISH Print Number: Biological Abstracts/RRM Vol. 046 Iss. 006 Ref. 082713
This book contains 13 papers discussing metalloenzymes involving amino acid-residue and related radicals. Some of the topics covered include free radical sites and their locations, mechanistic considerations, and enzymes that depend on the metals manganese, iron, cobalt, and copper. The work will be useful for researchers and students in chemistry, biochemistry, biophysics, enzymology, molecular biology, etc. Graphs, diagrams, tables, and charts illustrate the text.

7/7/59 (Item 5 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R)(c) 1997 BIOSIS. Allrts. reserv.
9567450 BIOSIS Number: 94072450
ENZYMES INVOLVED IN ANAEROBIC POLYETHYLENE GLYCOL DEGRADATION BY PELOBACTER-VENETIANUS AND BACTEROIDES STRAIN PG1
FRINGS J; SCHRAMM E; SCHINK B
FAKULTAET FUER BIOLOGIE DER UNIVERSITAET KONSTANZ, POSTFACH 5560, D-7750 KONSTANZ, GERMANY.
APPL ENVIRON MICROBIOL 58 (7). 1992. 2164-2167. CODEN: AEMID Full Journal Title: Applied and Environmental Microbiology Language: ENGLISH
In extracts of polyethylene glyucol (PEG)-grown cells of the strictly anaerobically fermenting bacterium Pelobacter venetianus, two different enzyme activities were detected, a diol dehydratase and a PEG-degrading enzyme which was characterized as a PEG acetaldehyde lyase. Both enzymes were oxygen sensitive and depended on a reductant, such as titanium citrate or sulfhydryl compounds, for optimal activity. Thediol dehydratase was inhibited by various corrinoids (adenosylcobalamin, cyanocobalamin, hydroxocobalamin, and methylcobalamin) by up to 37% at a concentration of 100 .mu.M. Changes in ionic strength and the K+ ion concentration had only limited effects on this enzyme activity; glycerol inhibited the enzyme by 95%. The PEG-degrading enzyme activity was stimulated by the samecorrinoids by up to 80%, exhibited optimal activity in 0.75 M potassium phosphate buffer or in the presence of 4 M KCl, and was only slightly affected by glycerol. Both enzymes were located in thecytoplasmic space. Also, another PEG-degrading bacterium, Bacteroides strain PG1, contained a PEG acetaldehyde lyase activity analogous to the corresponding enzyme of P. venetianus but no diol dehydratase. Our results confirm that corrinoid-influenced PEG degradation analogous to a diol dehydratase reaction is a common strategy among several different strictly anaerobic PEG-degrading bacteria.

7/7/74 (Item 20 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
2974674 BIOSIS Number: 69012081
FERMENTATION OF 1 2 PROPANEDIOL AND 1 2 ETHANEDIOL BY SOME GENERA OF ENTEROBACTERIACEAE INVOLVING COENZYME B-12 DEPENDENT DIOL DEHYDRATASE EC-4.2.1.28
TORAYA T; HONDA S; FUKUI S
LAB. IND. BIOCHEM., DEP. IND. CHEM., FAC. ENG., KYOTO UNIV., SAKYO, KYOTO 606, JPN.
J BACTERIOL 139 (1). 1979. 39-47. CODEN: JOBAA Full Journal Title: Journal of Bacteriology Language: ENGLISH
Klebsiella pneumoniae (Aerobacter aerogenes) ATCC 8724 grew anaerobically on 1,2-propanediol and 1,2-ethanediol as C and energy sources. Whole cells of the bacterium grown anarobically n 1,2-propanediol or on glycerol catalyzed conversion of 1,2-diols and aldehydes on the corresponding acidsand alcohols. Glucose-grown cells also converted aldehydes, but not 1,2-diols, to acids and alcohols. The presence of activities of coenzyme B12-dependent diol dehydratase, alcohol dehydrogenase, Co-A-dependent aldehyde dehydrogenase, phosphotransacetylase and acetate kinase was demonstrated with crude extracts of 1,2-propanediol-grown cells. The dependence of the levels of these enzymes on growth substrates, together with cofactor requirements in in vitro conversion of these substrates, indicates that 1,2-diols are fermented to the corresponding acids and alcohols via aldehydes, acyl-CoA and acyl phosphates. This metabolic pathway for 1,2-diol fermentation was also suggested in some other genera of Enterobacteriaceae which grew anaerobically on 1,2-propanediol. When the bacteria were cultivated in a 1,2-propanediol medium not supplemented with cobalt ion, the coenzyme B12-dependent conversion of 1,2-diols to aldehydes was the rate-limiting step in this fermentation. This was because the ntracellular concentration of coenzyme B12 was very low in the cells grown in cobalt-deficient medium, since theapoprotein of diol dehydratase was markedly induced in the cells grown in the 1,2-propanediol medium. Better cell yields were obtained when the bacteria were grown anaerobically on 1,2-propanediol. Aerobically grown cells evidently have a different metabolic pathway for utilizing 1,2-propanediol.

7/7/105 (Item 2 from file: 351) DIALOG(R)File 351:DERWENT WPI (c)1997 Derwent Info Ltd. All rts. reserv.
011021733 WPI Acc No: 96-518683/199651
Cosmid contg. Klebsiella pneumoniae gene for diol dehydratase - and related transformed microorganisms able to convert glycerol to 1,3-propanediol for polymer prodn
Patent Assignee: DU PONT DE NEMOURS & CO E I (DUPO)
Inventor: NAGARAJAN V; NAKAMURA C E
Number of Countries: 061 Number of Patents: 003
Patent Family:
Patent No Kind Date Applicat No Kind Date Main IPC Week
WO 9635795 A1 19961114 WO 96US6163 A 19960502 C12N-015/60 199651 B
AU 9657229 A 19961129 AU 9657229 A 19960502 C12N-015/60 199712
US 5633362 A 19970527 US 95440377 A 19950512 C07H-021/02 199727
Priority Applications (No Type Date): US 95440377 A 19950512
Cited Patents: 9. journal ref.
Patent Details:
Patent Kind Lan Pg Filing Notes Application Patent
WO 9635795 A1 E 48
Designated States (National): AL AU BB BG BR CA CN CZ EE GE HU IS JP KPKR LK LR LT LV MG MK MN MX NO NZ PL RO SG SI SK TR TT UA US UZ VN
Designated States (Regional): AT BE CH DE DK EA ES FI FR GB GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG
AU 9657229 A Based on WO 9635795
US 5633362 A 18
Abstract (Basic): WO 9635795 A
Cosmid (A) comprises a DNA fragment (I) of about 35 kb from Klebsiella pneumoniae that encodes an active diol dehydratase enzyme (II).
USE - Cells transformed with (I) or (A) can convert glycerol to 1,3-propanediol (IV) which is a monomer potentially useful forprodn. of polyester fibre, polyurethanes and cyclic cpds..
ADVANTAGE - This method provides efficient, cost effective and environmentally acceptable prodn. of (IV).
Dwg.0/4
Abstract (Equivalent): US 5633362 A
A cosmid comprising a DNA fragment of about 35 kb isolated from Klebsiella pneumoniae wherein said fragment encodes an active diol dehydratase enzyme having the restriction digest in FIG. 5, columns numbered 4, said cosmid contained within a transformed E. coli deposited with the American Type Culture Collection under accession number ATCC 69790. (Fig 5 not suitable for reproduction)
Dwg.0/0
Derwent Class: A41; D16; E17; F01
International Patent Class (Main): C07H-021/02; C12N-015/60
International Patent Class (Additional): C07H-021/04; C12N-001/19; C12N-001/21; C12N-009/04; C12N-009/88; C12N-015/53; C12N-015/74; C12N-015/79; C12P-007/18

9/6/1 (Item 1 from file: 155) 09265995 97457194
Glycerol conversion to 1,3-p ropanediol by Clostridiumpasteurianum:cloning and expression of the gene encoding 1,3-propanedioldehydrogenase.

9/6/2 (Item 2 from file: 155) 09229632 97388589
Anaerobic pathways of glyceroldissimilation byEnterobacter agglomerans CNCM 1210: limitations and regulations.

9/6/3 (Item 3 from file: 155) 08016680 94377734
Phenotypic diversity of anaerobic glycerotlissimilation shown by sevenenterobacterial species.

9/6/4 (Item 4 from file: 155) 07313946 93122543
Growth temperature-dependent activity of glycerol dehydratase in Escherichia coli expressing the Citrobacter freundii dha regulon.

9/6/5 (Item 5 from file: 155) 07070352 92121087
Sugar-glycerol cofermentations in lactobacilli: the fate of lactate.

9/6/6 (Item 6 from file: 155) 06924196 92152855
1,3-Propanediol production by Escherichia coli expressing genes from the Klebsiella pneumoniae dha regulon.

9/6/7 (Item 7 from file: 155) 05901057 90155202
Anaerobic growth of Escher ichia coli on glycerol by importing genes of thedha regulon from Klebsiella pneumoniae.

9/6/8 (Item 8 from file: 155) 05308385 87194586
Klebsiella pneumoniae 1,3-propanediol:NAD+oxidoreductase.

9/6/9 (Item 9 from file: 155) 03838735 83049313
[Coenzyme properties of adenosylcobalamin analogs with modifications in thepurine nucleus of the alpha-ligand] Kofermentnye svoistva analogov adenozilkobalamina sizmenennym purinovym iadrom al'fa-liganda.

9/6/10 (Item 10 from file: 155) 03825037 82183110
[Substrate specificity of ad enosylcobalamin-dependent glycerol dehydratase. Interaction with enantiomers of 1,2-propanediol] Substratnaia spetsifichnost' adenozilkobalaminzavisimoiglitseroldegidratazy. Vzaimodeistvie senantiomerami 1,2-propandiola.

9/6/11 (Item 11 from file: 155) 03151140 77065853
[Effect of environmental factors on inactivation of B12-dependent glycerotdehydratase from Aerobacter aerogenes] Vliianie faktorov sredy na inaktivatsiiu B12-zavisimoiglitseroldegidratazyiz Aerobacter aerogenes

9/6/12 (Item 12 from file: 155) 03134432 75174520
Glycerol dehydratase from Aerobacter aerogenes.

9/6/13 (Item 13 from file: 155) 02620573 79062639
[Effect of the structure of the nucleoside ligand of cobalamines on their enzymatic properties in a glycerotdehydratase system] Vliianie struktury nukleozidnogo liganda kobalaminov na ikh kofermentnye svoistva v sisteme glitseroldegidratazy.

9/6/14 (Item 14 from file: 155) 02491634 78061052
[9-(Adenylyl)alkylcobalamins as inhibitors ofadenosylcobalamin-dependent glycerotdehydratase from Aerobacter aerogenes] 9-(Adenilil)Alkilkobalaminykak ingibitory adenozilkobalamin-zavisimoiglitseroldegidratazyiz Aerobacter aerogenes.

9/6/15 (Item 15 from file: 155) 02449780 77242443
Study of the mechanism of action ofadenosylcobalamindependent glycerotdehydratase from Aerobacter aerogenes. II. The inactivation kinetics of glycerotdehydratase complexes with adenosylobalamin and its analogs.

9/6/16 (Item 16 from file: 155) 02449779 77242442
Study on the mechanism of action ofadenosylcobalamin-dependent glycerotdehydratase from Aerobacter aerogenes. I. Role of structural components of adenosylcobalamin the formation of the active site of glycerotdehydratase.

9/6/17 (Item 17 from file: 155) 02079984 76089220
[Role of monovalent cations in reactions catalyzed by glycerotdehydrase from Aerobacter aerogenes]

9/6/18 (Item 18 from file: 155) 01807381 74300091
Determination of glycerol dehydratase activity by the coupledenzymic method.

9/6/19 (Item 19 from file: 155) 01802219 74150185
[Determination of glycerotdehydratase activity by the method of coupled enzyme reactions] Opredelenie aktivnosti glitseroldegidratazy metodom sopriazheniia fermentativnykhreaktsii.

9/6/20 (Item 20 from file: 155) 01472942 75134080
[Study of purine analogs of cobamide coezyme in a glycerotdehydratase system from aerobacter aerogenes] Izuchenie purinovykh analogov kobamidnogo kofermenta v sisteme glitseroldegidratazyiz aerobacter aerogenes

9/6/21 (Item 21 from file: 155) 01424920 74269724
Allosteric interactions in glycerotdehydratase. Purification of enzyme and effects of positive and negativecooperativity for glycerol.

9/6/22 (Item 22 from file: 155) 01336562 74080757
[Formation of glycerotdehydratase by a culture of Aerobacter aerogenes, its partial purification and various properties] Obrazovanie glitseroldegidratazy kul'turoi Aerobacter aerogenes, ee chastichnaia ochistka i nekotorye svoistva.

9/6/23 (Item 23 from file: 155) 01244861 75002999
[Kinetics of irreversible inactivation ofholoenzyme and enzyme-substrate complexes of glycerotdehydratase] Kinetika neobratimoi inaktivatsii kholofermenta i fermentsubstratnykh kompleksov glitseroldegidratazy

9/6/24 (Item 24 from file: 155) 01209238 73067771
[Kinetics of the transformation of 1,2-propanediol topropionic aldehyde, atalyzed by glycerotdehydratase from Aerobacter aerogenes] Kinetika prevrashcheniia 1,2-propandiola v propionovyi al'degid, kataliziruemogo glitseroldegidratazoiiz Aerobacter aerogenes.

9/6/25 (Item 25 from file: 155) 01103372 70293158
Purification and properties of glycerotdehydrase.

9/6/26 (Item 26 from file: 155) 01081824 68277312
Mechanism of action of coenzyme B12-dependent glycerotdehydratase.

9/6/27 (Item 27 from file: 155) 00218268 67257076
Enzymatic determination of vita min B12, coenzyme B12, and othecobamide derivatives in picomole quantities by means of glycerotdehydratase from Aerobacter aerogenes.

9/6/28 (Item 28 from file: 155) 00136925 67124546
The properties of glycerol dehydratase isolated from Aerobacter aerogenes, and the properties of the apoenzyme subunits.

9/6/29 (Item 1 from file: 5) 13582798 BIOSIS Number: 99582798
Biochemical and molecular characterization of coenzyme B-12-dependent glycerotdehydratase from Citrobacter freundii Print Number: Biological Abstracts/RRM Vol. 049ss. 007 Ref. 118404

9/6/30 (Item 2 from file: 5) 13333745 BIOSIS Number: 99333745
Physiologic mechanisms involved in accumulation of 3-hydroxypropionaldehyde during fermentation of glycerol byenterobacteragglomerans Print Number: Biological Abstracts Vol. 103ss. 003 Ref. 036859

9/6/31 (Item 3 from file: 5) 12230210 BIOSIS Number: 98830210
Glycerol dehydratase activity: The limiting step for 1,3-propanediol production by Clostridiumbutyricum DSM 5431 Print Number: Biological Abstracts Vol. 101ss. 012 Ref. 180632

9/6/32 (Item 4 from file: 5) 10107492 BIOSIS Number: 95107492
FERMENTATION OF GLYC EROL TO 1 3 PROPANEDIOL IN CONTINUOUS CULTURES OF CITROBACTER-FREUNDII

9/6/33 (Item 5 from file: 5) 9107519 BIOSIS Number: 93092519
SUGAR GLYCEROL COFERMENTATIONS IN LACTOBACILLI THE FATE OF LACTATE

9/6/34 (Item 6 from file: 5) 7479751 BIOSIS Number: 89130770
UTILIZATION OF GLYCEROL AS A HYDROGEN ACCEPTOR BY LACTOBACILLUS-REUTERI PURIFICATION OF 1 3 PROPANEDIOL NAD OXIDOREDUCTASE

9/6/35 (Item 7 from file: 5) 7479748 BIOSIS Number: 89130767
PURIFICATION AND CHAR ACTERIZATION OF GLYCEROL DEHYDRATASE FROMLACTOBACILLUS-REUTERI

9/6/36 (Item 8 from file: 5) 4521051 BIOSIS Number: 78094874
ANAEROBIC REDUCTION OF GLYCEROL TO 1 3 PROPANEDIOL BY LACTOBACILLUS-BREVIS AND LACTOBACILLUS-BUCHNERI

9/6/37 (Item 9 from file: 5) 4402667 BIOSIS Number: 77077994
COBALT C CORRINOIDS THE DERIVATIVES OF VITAMIN B-12 PSEUDOFORMS AS CORRINOID ENZYME INHIBITORS

9/6/38 (Item 10 from file: 5) 4347088 BIOSIS Number: 77022415
SOME PHYSICOCHEMICAL FEATURES GLYCEROL DEHYDRATASE CATALYZED REACTIONS

9/6/39 (Item 11 from file: 5) 4343221 BIOSIS Number: 77018548
PRODUCTION OF 3 HYDROXY PROPIONALDEHYDE FROM GLYCEROL

9/6/40 (Item 12 from file: 5) 4167203 BIOSIS Number: 26019546
COENZYME PROPERTIES OF ADENOSYL COBALAMIN ANALOGS WITH A CHANGED PURINE NUCLEUS OF THE ALPHA LIGAND

9/6/41 (Item 13 from file: 5) 4079098 BIOSIS Number: 76028949
COENZYME PROPERTIES OF ADENOSYL COBALAMIN ANALOGS WITH MODIFICATIONS IN THE ALPHA LIGAND

9/6/42 (Item 14 from file: 5) 3847492 BIOSIS Number: 24054851
SUBSTRATE SPECIFICITY OF ADENOSYL COBALAMIN DEPENDENT GLYCEROL DEHYDRATASE EC-4.2.1.30 INTERACTION WITH ENANTIOMERS OF 1 2 PROPANEDIOL

9/6/43 (Item 15 from file: 5) 3693569 BIOSIS Number: 73085936
GLYCEROL FERMENTATIO N IN KLEBSIELLA-PNEUMONIAE FUNCTIONS OF THE COENZYMEB-12 DEPENDENT GLYCEROL AND DIOL DEHYDRATASES

9/6/44 (Item 16 from file: 5) 2974635 BIOSIS Number: 69012042
INTERACTION OF SUBSTRATES AND THEIR ANALOGS WITH ADENOSYL COBALAMIN DEPENDENT GLYCEROL DEHYDRATASE

9/6/45 (Item 17 from file: 5) 2944727 BIOSIS Number: 19049636
PARTICIPATION OF CYCLIC AMP IN REGULATION OF COENZYME B-12 DEPENDENTGLYCEROL DEHYDRATASE EC-4.2.1.30 SYNTHESIS FROM KLEBSIELLA-PNEUMONIAE ATCC-25955

9/6/46 (Item 18 from file: 5) 2944720 BIOSIS Number: 19049629
ADENOSYL COBALAMIN DE PENDENT GLYCEROL DEHYDRATASE EC-4.2.1.30 INTERACTION WITH SUBSTRATES AND THEIR ANALOGS

9/6/47 (Item 19 from file: 5) 2937208 BIOSIS Number: 19042117
ENZYMATIC ESTIMATION OF VITAMIN B-12

9/6/48 (Item 20 from file: 5) 2856392 BIOSIS Number: 18028803
INTERACTION OF SUBSTRA TES AND THEIR ANALOGS WITH ADENOSYL COBALAMIN DEPENDENT GLYCEROL DEHYDRATASE EC-4.2.1.30

9/6/49 (Item 21 from file: 5) 2835422 BIOSIS Number: 18007833
EFFECT OF STRUCTURE OF NUCLEOSIDE LIGAND OF COBALAMINS ON THEIR COENZYME PROPERTIES IN THE GLYCEROL DEHYDRATASE EC-4.2.1.30 SYSTEM

9/6/50 (Item 22 from file: 5) 2782252 BIOSIS Number: 68037159
EFFECT OF THE NUCLEOS IDE LIGAND STRUCTURE OF COBALAMINS ON THEIR COENZYMIC PROPERTIES IN THE GLYCEROL DEHYDRATASE SYSTEM

9/6/51 (Item 23 from file: 5) 2775647 BIOSIS Number: 68030554
SEARCH FOR NEW MEDICINAL PREPARATIONS ON THE BASIS OF VITAMIN B-12 DERIVATIVES SYNTHESIS AND STUDY OF THE PHYSICOCHEMICAL AND COENZYME PROPERTIES OF ADENOSYL COBALAMIN DERIVATIVES

9/6/52 (Item 24 from file: 5) 2106317 BIOSIS Number: 63010737
THE ROLE OF E PROPANAMIDE GROUP OR THE CORRIN MACRO CYCLE IN THE MANIFESTATION OF COENZYMIC PROPERTIES OF THE COBAMIDE COENZYME

9/6/53 (Item 25 from file: 5) 1666115 BIOSIS Number: 60010683
STUDY OF PURINE ANALOGS OF THE COBAMIDE COENZYME IN THE GLYCEROL DEHYDRATASE SYSTEM FROM AEROBACTER-AEROGENES

9/6/54 (Item 1 from file: 73) 8406923 EMBASE No: 92083103
Sugar-glycerol cofermentations in lactobacilli: The fate of lactate

9/6/55 (Item 2 from file: 73) 6412604 EMBASE No: 87149266
Klebsiellapneumoniae 1,3-propanediol:NADsup +oxidoreductase

9/6/56 (Item 3 from file: 73) 1264966 EMBASE No: 79032619
Effects of the nucleoside ligands structure of cobalamines on their coenzymic properties in glyceroldehydratase

9/6/57 (Item 4 from file: 73) 1000051 EMBASE No: 78170429
Study on the mechanism of action ofadenosylcobalamin-dependent glycerol dehydratase from Aerobacter aerogenes. II. The inactivation kinetics of glyceroldehydratase complexes with adenosylcobalamin and its analogs

9/6/58 (Item 5 from file: 73) 1000050 EMBASE No: 78170428
Study on the mechanism of action ofadenosylcobalamin-dependent glyceroldehydratase from Aerobacter aerogenes. I. Role of structural components of adenosylcobalamin in the formation of the active site of glyceroldehydratase

9/6/59 (Item 6 from file: 73) 859479 EMBASE No: 78025357
Influence of environmental factors on the inactivation oBsub 1sub 2 dependent glycerol dehydratase from Aerobacter aerogenes

9/6/60 (Item 7 from file: 73) 630679 EMBASE No: 77007407
The role of monovalent cations in reactions catalyzed by glyceroldehydratase from Aerobacter aerogenes

9/6/61 (Item 8 from file: 73) 516161 EMBASE No: 93310393
Response to vasoactive ne uropeptides in basilar arteries isolated from stroke-prone spontaneouslyhypertensive rats

9/6/62 (Item 9 from file: 73) 466469 EMBASE No: 76048032
The interaction of apoglycerol dehydratase from Aerobacter aerogenes with 'apurine' analogs of cobamide coenzyme

9/6/63 (Item 10 from file: 73) 444734 EMBASE No: 76025321
Production of glycerol dehydratase by culture of Aerobacter aerogenes, its partial purification, and some properties

9/6/64 (Item 11 from file: 73) 372001 EMBASE No: 75167006
Investigation of purine analogues of the cobamide coenzyme in theglyceroldehydratase system fromAerobacter aerogenes (Russian)

9/7/1 (Item 1 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
09265995 97457194
Glycerol conversion to 1,3-propanediol by Clostridium pasteurianum: cloning and expression of the gene encoding 1,3-propanediol dehydrogenase.
Luers F; Seyfried M; Daniel R; Gottschalk G
Institut fur Mikrobiologie der Georg-August-Universitat, Gottingen, Germany.
FEMS Microbiol Lett (NETHERLANDS) Sep 15 1997, 154 (2) p337-45, ISSN 0378-1097 Journal Code: FML Languages: ENGLISH Document type: JOURNAL ARTICLE
When grown on glycerol as sole carbon and energy source, cell extracts of Clostridium pasteurianum exhibited activities of glycerol dehydrogenase, dihydroxyacetone kinase, glycerol dehydratase and 1,3-propanediol dehydrogenase. The genes encoding the latter two enzymes were cloned by colony hybridization using the dhaT gene of Citrobacter freundii as a heterologous DNA probe and expressed in Escherichia coli. The native molecular mass of 1,3-propanediol dehydrogenase (DhaT) is 440,000 Da. The dhaT gene of C. pasteurianum was subcloned and its nucleotide sequence (1158 bp) was determined. The deduced gene product (41,776 Da) revealed high similarity to DhaT of C. freundii (80.5% identity; 89.8% similarity).

9/7/4 (Item 4 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
07313946 93122543
Growth temperature-dependent activity of glycerol dehydratase in Escherichia coli expressing the Citrobacter freundii dha regulon.
Daniel R; Gottschalk G
Institute fur Mikrobiologie, Georg-August-Universitat, Gottingen, FRG.
FEMS Microbiol Lett (NETHERLANDS) Dec 15 1992, 79 (1-3) p281-5, ISSN 0378-1097 Journal Code: FML Languages: ENGLISH Document type: JOURNAL ARTICLE
Using the cosmid pWE15, a genomic library of Citrobacter freundii DNA in Escherichia coli ECL707 was prepared and screened for glycerol utilization. Six out of approximately 3000 clones were positive. One clone, harboring the recombinant cosmid pRD1, expressed glycerol dehydratase in high activity when grown at 28 degrees C but not at 37 degrees C. The growth temperature had little effect on the activity of the other enzymes encoded by the dha regulon. When the glycerol-containing medium was supplemented with corrinoids, the recombinant E. coli strain produced 1,3-propanediol in high amounts at 28 degrees C.

9/7/5 (Item 5 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
07070352 92121087
Sugar-glycerol cofermentations in lactobacilli: the fate of lactate.
Veiga da Cunha M; Foster MA
Department of Biochemistry, University of Oxford, United Kingdom.
J Bacteriol (UNITED STATES) Feb 1992, 174 (3) p1013-9, ISSN 0021-9193 Journal Code: HH3 Languages: ENGLISH Document type: JOURNAL ARTICLE
The simultaneous fermentation of glycerol and sugar by lactobacillus brevis B22 and Lactobacillus buchneri B190 increases both the growth rate and total growth. The reduction of glycerol to 1,3-propanediol by the lactobacilli was found to influence the metabolism of the sugar cofermented by channelling some of the intermediate metabolites (e.g., pyruvate) towards NADH-producing (rather than NADH-consuming) reactions. Ultimately, the absolute requirement for NADH to prevent the accumulation of 3-hydroxypropionaldehyde leads to a novel lactate-glycerobofermentation. s a result, additional ATP can be made not only by (i) converting pyruvate to acetate via acetyl phosphate rather than to the ethanol usually found and (ii) oxidizing part of the intermediate pyruvate to acetate instead of the usual reduction to lactate but also by (iii) reoxidation of accumulated lactate to acetate via pyruvate. The conversion of lactate to pyruvate is probably catalyzed by NAD-independent lactate dehydrogenases that are found only in the cultures oxidizing lactate and producing 1,3-propanediol, suggesting a correlation between the expression of these enzymes and a raised intracellular NAD/NADH ratio. The enzymes metabolizing glycerol (glycerol dehydratase and 1,3-propanediol dehydrogenase) were expressed in concert without necessary induction by added glycerol, although their expression may also be influenced by the intracellular NAD/NADH ratio set by the different carbohydrates fermented.

9/7/8 (Item 8 from file: 155) DIALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
05308385 87194586
Klebsiella pneumoniae 1,3-propanediol:NAD+ oxidoreductase.
Johnson EA; Lin EC

J Bacteriol (UNITED STATES) May 1987, 169 (5) p2050-4, ISSN 0[redacted]3 Journal Code: HH3 Contract/Grant No.: 5-R01-GM11983, GM, NIG[redacted] Languages: ENGLISH Document type: JOURNAL ARTICLE
Fermentative utilization of glycerol, a more reduced carbohydrate than [redacted]ses and ketoses, requires the disposal of the two extra hydrogen atoms. This is accomplished by sacrificing an equal quantity of glycerol via an auxiliary pathway initiated by glycerol dehydratase. The product, 3-hydroxypropionaldehyde, is then reduced by 1,3-propanediol NAD+:oxidoreductase (1,3-propanediol dehydrogenase; EC 1.1.1.202), resulting in the regeneration of NAD+ from NADH. The pathway for the assimilation of glycerol is initiated by an NAD-linked dehydrogenase. In Klebsiella pneumoniae the two pathways are encoded by the dha regulon whichis inducible only anaerobically. In this study 1,3-propanediol:NAD+oxidoreductase was purified from cells grown anaerobically on glycerol. The enzyme was immunochemically distinct from the NAD-linked glycerol dehydrogenase and was an octamer or hexamer of a polypeptide of 45,000 +/- 3,000 daltons. When tested as a dehydrogenase, only 1,3-propanediol served as a substrate; no activity was detected with ethanol, 1-propanol, 1,2-propanediol, glycerol, or 1,4-butanediol. The enzyme was inhibited by chelators of divalent cations. An enzyme preparation inhibited by alpha,alpha'-dipyridyl was reactivated by the addition of Fe2+ or Mn2+ after removal of the chelator by gel filtration. As for glycerol dehydrogenase, 1,3-propanediol oxidoreductase is apparently inactivated by oxidation during aerobic metabolism, under which condition the enzyme becomes superfluous.

9/7/12 (Item 12 from file: 155) IALOG(R)File 155:MEDLINE(R) (c) format only 1997 Knight-Ridder Info. Allrts. reserv.
03134432 75174520
Glycerol dehydratase from Aerobacter aerogenes.
Johnson BC; Stroinski A; Schneider Z
Methods Enzymol (UNITED STATES) 1975, 42 p315-23, ISSN 0076-6879 Journal Code: MVA Languages: ENGLISH Document type: JOURNAL ARTICLE

9/7/29 (Item 1 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
13582798 BIOSIS Number: 99582798
Biochemical and molecular characterization of coenzyme B-12-dependent glycerol dehydratase from Citrobacter freundii
Daniel R; Seyfried M; Gottschalk G
Inst. Mikrobiol. Georg-August-Univ. Goettingen, Grisebachstr. 8, 37077 Goettingen, Germany
Abstracts of the General Meeting of the American Society for Microbiology 97 (0). 1997. 353. Full Journal Title: 97th General Meeting of the American Society for Microbiology, Miami Beach, Florida, USA, May 4-8, 1997. Abstracts of the General Meeting of the American Society for Microbiology ISSN: 1060-2011 Language: ENGLISH Print Number: Biological Abstracts/RRM Vol. 049 Iss. 007 Ref. 118404

9/7/31 (Item 3 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
12230210 BIOSIS Number: 98830210
Glycerol dehydratase activity: The limiting step for 1,3-propanediol production by Clostridium butyricum DSM 5431
Abbad-Andaloussi S; Guedon E; Spiesser E; Petitdemange H
Lab. Chimie Biol. I, Univ. Henri Poincare Nancy I, BP 239, 54506 Vandoeuvre-les-Nancy Cedex, France
Letters in Applied Microbiology 22 (4). 1996. 311-314. Full Journal Title: Letters in Applied Microbiology ISSN: 0266-8254 Language: ENGLISH Print Number: Biological Abstracts Vol. 101Iss. 012 Ref. 180632
Glycerol catabolism by Clostridium butyricum DSM 5431 into acetate, butyrate and 1,3-propanediol (1,3-PD) was studied in chemostat culture. The fact that the intracellular concentrations of NADH (18-22 mu-mol g-1 dry cell mass) were extremely high suggested that the dehydratase activity was the rate limiting step in 1,3-PD formation. This limitation was proved by the addition of propionaldehyde, another substrate of propanediol dehydrogenase, into the culture medium. This resulted in an increase in (i) glycerol utilization, (ii) biomass formation and (iii) product biosynthesis.

9/7/32 (Item 4 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
10107492 BIOSIS Number: 95107492
FERMENTATION OF GLYCEROL TO 1 3 PROPANEDIOL IN CONTINUOUS CULTURES OF CITROBACTER-FREUNDII
BOENIGK R; BOWIEN S; GOTTSCHALK G
INSTITUT FUER MIKROBIOLOGIE, GEORG-AUGUST-UNIVERSITAET GOETTINGEN, GRISEBACHSTRASSE 8, W-3400 GOETTINGEN, GERMANY.
APPL MICROBIOL BIOTECHNOL 38 (4). 1993. 453-457. CODEN: AMBID Full Journal Title: Applied Microbiology and Biotechnology Language: ENGLISH
The conversion of glycerol to 1,3-propanediol by Citrobacter freundii DSM 30040 was optimized in single- or two-stage continuous cultures. The productivity of 1,3-propanediol formation was higher under glycerol limitation and increased with the dilution rate (D) to a maximum of 3.7 g .cntdot. 1-1 .cntdot. h-1. Glycerol dehydratase seemed to be the rate-limiting step in 1, 3-propane-diol formation. Conditions for the two-stage fermentation process were as follows: first stage, glycerol limitation (250 mM), pH 7.2, D = 0.1 h-1, 32.degree. C; second stage, additional glycerol, pH 6.6, D = 0.05 h-1, 28.degree. C. Under these conditions 876 mM glycerol were consumed, the final 1,3-propanediol concentrations was 545 mM, and the overall productivity. 1.38 g .cntdot. l-1 .cntdot. h-1.

9/7/33 (Item 5 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
9107519 BIOSIS Number: 93092519
SUGAR GLYCEROL COFERMENTATIONS IN LACTOBACILLI THE FATE OF LACTATE
VEIGA DA CUNHA M; FOSTER M A
MICROBIOL. UNIT, DEP. BIOCHEM., UNIV. OXFORD, OXFORD OX1 3QU, UK.
J BACTERIOL 174 (3). 1992. 1013-1019. CODEN: JOBAA Full Journal Title: Journal of Bacteriology Language: ENGLISH
The simultaneous fermentation of glycerol and sugar by Lactobacillus brevis B22 and Lactobacillus buchneri B190 increases both the growth rate and total growth. The reduction of glycerol to 1,3-propanediol by the lactobacilli was found to influence the metabolism of the sugar cofermented by channelling some of the intermediate metabolites (e.g., pyruvate) towards NADH-producing (rather than NADH-consuming) reactions. Ultimately, the absolute requirement for NADH to prevent the accumulation of 3-hydroxypropionaldehyde leads to a novel lactate-glycerol cofermentation. As a result, additional ATP can be made not only by (i) converting pyruvate to acetate via acetyl phosphate rather than to the ethanol usually found and (ii) oxidizing part of the intermediate pyruvate to acetate instead of the usual reduction to lactate but also by (iii) reoxidation of accumulated lactate to acetate via pyruvate. The conversion of lactate to pyruvate is probably catalyzed by NAD-independent lactate dehydrogenases that are found only in the cultures oxidizing lactate and producing 1,3-propanediol, suggesting a correlation between the expression of these enzymes and a raised intracellular NAD/NADH ratio. The enzymes metabolizing glycerol (glycerol dehydratase and 1,3-propanediol dehydrogenase) were expressed in concert without necessary induction by added glycerol, although their expression may also be influenced by the intracellular NAD/NADH ratio set by the different carbohydrates fermented.

9/7/35 (Item 7 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
7479748 BIOSIS Number: 89130767
PURIFICATION AND CHARACTERIZATION OF GLYCEROL DEHYDRATASE FROM LACTOBACILLUS-REUTERI
TALARICO T L; DOBROGOSZ W J
DEP. MICROBIOL., NORTH CAROLINA STATE UNIV., RALEIGH, N.C. 27695.
APPL ENVIRON MICROBIOL 56 (4). 1990. 1195-1197. CODEN: AEMID Full Journal Title: Applied and Environmental Microbiology Language: ENGLISH
A coenzyme B12-dependent glycerol dehydratase from Lactobacillus reuteri has been purified and characterized. The dehydratase has a molecular weight of approximately 200,000, and sodium dodecyl sulfate-polyacrylamide gel electrophoresis yielded a single major band with a molecular weight of 52,000. Km values for substrates and coenzyme B12 were in the millimolar and the submicromolar range, respectively.

9/7/36 (Item 8 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) c) 1997 BIOSIS. Allrts. reserv.
4521051 BIOSIS Number: 78094874
ANAEROBIC REDUCTION OF GLYCEROL TO 1 3 PROPANEDIOL BY LACTOBACILLUS-BREVIS AND LACTOBACILLUS-BUCHNERI
SCHUETZ H; RADLER F
INSTITUT FUER MIKROBIOLOGIE UND WEINFORSCHUNG, UNIVERSITAET MAINZ, POSTFACH 3980, D-6500 MAINZ.
SYST APPL MICROBIOL 5 (2). 1984. 169-178. CODEN: SAMID Full Journal Title: Systematic and Applied Microbiology Language: ENGLISH
Three strains of L. brevis and 1 strain of L. buchneri grew very poorly on glucose. Good growth was observed on glucose plus glycerol; while glucose was fermented to acetate or ethanol, lactate and CO2, glycerol was dehydrated to 3-hydroxypropanal and subsequently reduced to 1,3-propanediol. Cell extracts of L. brevis and L. buchneri grown on glucose plus glycerol contained a B12-dependent glycerol dehydratase and a 1,3-propanediol dehydrogenase. Glycerol was not metabolized when used as the only substrate. Fructose as sole C source was partially reduced to mannitol. The joint fermentation of fructose and glycerol yielded 1,3-propanediol from glycerol. Ribose was fermented but did not support glycerol fermentation. Extracts from ribose grown cells did not contain glycerol dehydratase or 1,3-propanediol dehydrogenase. Besides glycerol the following diols were metabolized as cosubstrates with glucose: 1,2-propanediol, ethylene glycol and 2,3-butanediol yielding 1-propanol, ethanol and 2-butanol, respectively. Washed cells of 2 L.brevis strains B 18 and B 20 formed 1,3-propanediol and 1,2-propanediol from glycerol; the third strain, B 22, formed only 1,2-propanediol from glycerol in the absence of glucose.

9/7/38 (Item 10 from file: 5) DIALOG(R)File 5:BIOSIS PREVIEWS(R) (c) 1997 BIOSIS. Allrts. reserv.
4347088 BIOSIS Number: 77022415
SOME PHYSICOCHEMICAL FEATURES GLYCEROL DEHYDRATASE CATALYZED REACTIONS
POZNANSKAYA A A; KOROSOVA T L
SCI.-PROD. ASSOC. "VITAM.", MOSCOW, USSR.
BIOKHIMIYA 48 (4). 1983. 539-543. CODEN: BIOHA Full Journal Title: Biokhimiya Language: RUSSIAN
The concentration of active centers in preparations of B12-dependent glycerol dehydratase from Klebsiella pneumoniae was determined by their titration with the coenzyme, adenosylcobalamine (AdoCbl). Some kinetic and thermodynamic features of the reactions catalyzed by the enzyme were established. The data obtained are indicative of a significant contribution of hydrophobic interactions to the substrate and AdoCbl binding to glycerol dehydratase.

9/7/54 (Item 1 from file: 73) DIALOG(R)File 73:EMBASE (c) 1997 Elsevier Science B.V. Allrts. reserv.
8406923 EMBASE No: 92083103
Sugar-glycerol cofermentations in lactobacilli: The fate of lactate
Da Cunha M.V.; Foster M.A.

Microbiology Unit, Department of Biochemistry, University of Oxfor[redacted]d OX1 3QU United Kingdom
J. BACTERIOL. (USA), 1992, 174/3 (1013-1019) CODEN: JOBAA[redacted]SSN: 0021-9193 LANGUAGES: English SUMMARY LANGUAGES: English

The simultaneous fermentation of glycerol and sugar by Lactobacillus brevis B22 and Lactobacillus buchneri B190 increases both the growth rate and total growth. The reduction of glycerol to 1,3-propanediol by the lactobacilli was found to influence the metabolism of the sugar cofermented by channelling some of the intermediate metabolites (e.g., pyruvate) towards NADH-producing (rather than NADH-consuming) reactions. Ultimately, the absolute requirement for NADH to prevent the accumulation of 3-hydroxypropionaldehyde leads to a novel lactate-glycerobofermentation. As a result, additional ATP can be made not only by (i) converting pyruvate to acetate via acetyl phosphate rather than to the ethanol usually found and (ii) oxidizing part of the intermediate pyruvate to acetate instead of the usual reduction to lactate but also by (iii) reoxidation of accumulated lactate to acetate via pyruvate. The conversion of lactate to pyruvate is probably catalyzed by NAD-independent lactate dehydrogenases that are found only in the cultures oxidizing lactate and producing 1,3-propanediol, suggesting a correlation between the expression of these enzymes and a raised intracellular NAD/NADH ratio. The enzymes metabolizing glycerol (glycerol dehydratase and 1,3-propanediol dehydrogenase) were expressed in concert without necessary induction by added glycerol, although their expression may also be influenced by the intracellular NAD/NADH ratio set by the different carbohydrates fermented.

(FILE 'USPAT' ENTERED AT 13:10:59 ON 09 DEC 1997)
L1 13 S (DIOL OR GLYCEROL) (2N)(DEHYDRASE OR DEHYDRATASE)

1. 5,686,276, Nov. 11, 1997, Bioconversion of a fermentable carbon source to 1,3-propanediol by a single microorganism; Lisa Anne Laffend, et al., 435/158, 252.31, 252.33 :IMAGE AVAILABLE:

2. 5,633,362, May 27, 1997, Production of 1,3-propanediol from glycerol by recombinant bacteria expressing recombinant **diol** **dehydratase**; Vasantha Nagarajan, et al., 536/23.1; 435/252.3, 252.33; 536/22.1, 24.3 :IMAGE AVAILABLE:

3. 5,599,689, Feb. 4, 1997, Process for making 1,3-propanediol from carbohydrates using mixed microbial cultures; Sharon L. Haynie, et al., 435/42, 158 :IMAGE AVAILABLE:

4. 5,589,372, Dec. 31, 1996, Squalene synthetase; Gordon W. Robinson, 435/193, 252.3, 254.11, 320.1, 348, 355, 358, 365; 536/23.2, 24.3 :IMAGE AVAILABLE:

5. 5,480,641, Jan. 2, 1996, Feed additive which consists of whey and Lactobacillus reuteri and a method of delivering Lactobacillus reuteri to the gastrointestinal tract; Ivan A. Casas-Perez, 424/93.45, 93.4; 426/61; 435/252.9, 853 :IMAGE AVAILABLE:

6. 5,458,875, Oct. 17, 1995, In ovo method for delivering Lactobacillus reuteri to the gastrointestinal tract of poultry; Ivan A. Casas-Perez, et al., 424/93.45; 119/6.8; 424/93.4; 435/252.1, 252.9 :IMAGE AVAILABLE:

7. 5,439,678, Aug. 8, 1995, Method for inhibiting microorganism growth; Walter J. Dobrogosz, et al., 424/93.45, 93.4; 426/61; 435/34, 123, 244, 252.1; 514/693 :IMAGE AVAILABLE:

8. 5,413,960, May 9, 1995, Antibiotic reuterin; Walter J. Dobrogosz, et al., 435/189, 124, 184 :IMAGE AVAILABLE:

9. 5,405,839, Apr. 11, 1995, Vitamin B.sub.12 derivative, preparation process thereof, and use thereof; Tetsuo Toraya, et al., 514/52;536/26.4, 26.41 :IMAGE AVAILABLE:

10. 5,352,586, Oct. 4, 1994, Method of determining the presence of an antibiotic produced by Lactobacillus reuteri; Walter J. Dobrogosz, et al., 435/34, 41, 124, 183, 252.1, 853 :IMAGE AVAILABLE:

11. 5,164,309, Nov. 17, 1992, Process for the microbiological preparation of 1,3-propane-diol from glycerol by citrobacter; G. Gottschalk, et al., 435/158, 252.1 :IMAGE AVAILABLE:

12. 4,962,027, Oct. 9, 1990, Production of 3-hydroxypropionaldehyde from glycerol by Klebsiella pneumoniae; Patricia J. Slininger, et al., 435/147, 155, 244, 252.1 :IMAGE AVAILABLE:

13. 4,235,869, Nov. 25, 1980, Assay employing a labeled Fab-fragment ligand complex; Moshe Schwarzberg, 436/512; 250/302; 435/7.7, 7.72, 968; 436/513, 536, 537, 541, 800 :IMAGE AVAILABLE:

US PAT NO: 5,633,362 :IMAGE AVAILABLE: L1: 2 of 13

ABSTRACT:
A process is provided for the bioconversion of glycerol to 1,3-propanediol in which genes from a bacteria known to possess a **diol** **dehydratase** enzyme for 1,2-propanediol degradation are cloned into a bacterial host and the host is grown in the presence of glycerol; expression of the foreign genes in the host cell facilitates the enzymatic conversion of glycerol to 1,3-propanediol which is isolated from the culture.

What is claimed is:
1. A cosmid comprising a DNA fragment of about 35 kb isolated from Klebsiella pneumoniae wherein said fragment encodes an active **diol** **dehydratase** enzyme having the restriction digest in FIG. 5, columns numbered 4, said cosmid contained within a transformed E. coli deposited with the American Type Culture Collection under accession number ATCC 69790.

2. A transformed microorganism comprising a host microorganism and the cosmid of claim 1.

3. The transformed microorganism of claim 2 wherein the host microorganism is Ecoli, and which is deposited with the American Type Culture Collection as accession number ATCC 69790.

4. The cosmid of claim 1 which when transformed into bacteria causes metabolism of glycerol to 1,3-propanediol.

5. A transformed microorganism comprising a host microorganism and a DNA fragment of the cosmid of claim 1, said fragment encoding an active functional protein.

6. A DNA fragment comprising a gene encoding a **diol** **dehydratase** enzyme, said gene encompassed by the cosmid of claim 1.

7. A isolated gene encoding an active **diol** **dehydratase** enzyme comprising a contiguous sequence which consists of SEQ ID NO: 1.

8. A isolated gene encoding an active alcohol dehydrogenase comprising a contiguous sequence which consists of SEQ ID NO: 2.

9. A transformed microorganism comprising a host microorganism and the heterologous gene of claim 7 or claim 8.

10. A transformed microorganism comprising E.coli DH5.alpha. and the DNA sequence of claim 7 or claim 8.

US PAT NO: 5,164,309 :IMAGE AVAILABLE: L1: 11 of 13

ABSTRACT:
A process of the microbiological preparation of 1,3 propanediol from glycerol in growth media of suitable bacterial strains is described, accompanied by the addition of a substrate in the form of a H-donor and the separation of the propanediol formed. It is characterized in that a) biomass is formed in a growth phase from the selected bacterial strain and accompanied by feeding with glycerol and, if necessary, while substantially excluding the H-donor until a stationary growth phase occurs and b) further glycerol and H-donor matched t the biomass are added to the resulting stationary cell suspension for increased 1,3-propanediol formation. This process makes it possible to produce 1,3-propanediol in a high yield from glycerol with a small amount of unobjectionable by-products in batchwise manner or in continuous form, following immobilization.

We claim:
1. In a process for the microbiological preparation of 1,3-propanediol by cultivating in a growth medium containing glycerol and a bacterial strain which is able to convert the glycerol into 1,3-propanediol and isolating the 1,3-propanediol thus obtained, the improvement which comprises the steps of:
(i) forming a biomass by culturing a bacterial strain from the Citrobacter genus in the growth medium containing glycerol, wherein the formation of the biomass is carried out with the substantial exclusion of any H donor; permitting the bacterial cells to reach a stationary cell phase; thereafter adding to said biomass additional glycerol and a sugar as an H-donor to the biomass, while keeping the cells in essentially a stationary phase; and (iv) then isolating the 1,3-propanediol thus prepared.

2. The process according to claim 1 wherein said strain is a strain of Citrobacter freundii.

3. The process according to claim 1 wherein step () is performed under anaerobic conditions.

4. The process according to claim 1 wherein step (ii) is preformed under anaerobic conditions.

5. The process according to claim 1 wherein a pH-value of approximately 6.5 to 8.5 is maintained in steps) and (iii).

6. The process according to claim 1 wherein steps () and (iii) are performed in a mineral medium.

7. The process according to claim 1 wherein step () is concluded by the addition of a predetermined quantity of phosphate or nitrogen source.

8. The process according to claim 7 wherein an ammonium salt is used as the nitrogen source or a potassium dihydrogen phosphate is used as the phosphate source.

9. The process according to claim 1 wherein glycerol is initially present in step (iii) in the amount of 0.2 to 1.5 molar concentration.

10. The process according to claim 1 wherein glycerol is initially present in step (iii) in approximately 0.1 to 0.4 molar concentration.

11. The process according to claim 1 wherein said biomass obtained in step(i) is immobilized before step (iii).

12. The process according to claim 11 wherein said immobilization is carried out with calcium alginate.

US PAT NO: 4,962,027 :IMAGE AVAILABLE: L1: 12 of 13

ABSTRACT:
A method is disclosed for producing 3-hydroxypropionaldehyde (3-HPA) from glycerol by culturing the bacterium Klebsiella pneumoniae having the identifying characteristics of NRRL B-4011, under aerobic conditions, in an aqueous nutrient medium containing glycerol and a compound that causes 3-HPA to be accumulated by blocking the conversion of 3-HPA to trimethylene glycol. This process is particularly useful for the production, from renewable resources, of acrylic acid, an industrially important polymerizable monomer used in the manufacture of synthetic polymers and plastics and which is presently derived from fossil fuel sources.

We claim:
1. A method for the production of 3-hydroxypropionaldehyde (3-HPA) from glycerol, which comprises culturing the bacterium Klebsiella pneumoniae NRRL B-4011 or subcultures thereof, under aerobic conditions, in an aqueous nutrient medium containing an amount of glycerol effective for the induction of **"glycerol"** **"dehydratase"** and the production of a recoverable quantity of 3-HPA, and an amount of semicarbazide hydrochloride sufficient to prevent the conversion of 3-HPA to trimethylene glycol, until a recoverable quantity of 3-HPA is produced.

2. The method of claim 1 wherein said bacterium is first grown in an aqueous nutrient medium containing a carbon source which induces the production of dehydratase enzyme and further incubated in an aqueous medium containing glycerol and semicarbazide hydrochloride.

3. The method of claim 2 wherein said carbon source is glycerol, 1,2-propanediol, or 1,2-ethanediol.